Analysis and Implications of Digital Humanities Projects in the Chinese Context: Postprint Review of the DH2020 Project Selection

Authors: Shen Lili, Zhang Hongling, Han Chunlei, Liu Wei

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Abstract

[Purpose/Significance] This study analyzes 51 digital humanities projects in Chinese contexts solicited at the 2020 Digital Humanities Annual Conference organized by Shanghai Library, summarizes the general landscape of digital humanities projects on Chinese cultural themes in the Chinese-speaking world, and provides references for the future development of digital humanities in China. [Method/Process] Employing web survey and data analysis methods, this research conducts a classified investigation of the 51 digital humanities projects, analyzing and discussing their research objects, research methods, infrastructure types, and practical significance to extract valuable characteristics. It further conducts in-depth exploration across four dimensions: "Digital Humanities and Humanities Disciplines," "Technical Means and Methodological Applications," "Infrastructure Construction," and "Service Models and Problem Solving." [Results/Conclusions] The summary of the 51 projects reveals five major characteristics: vigorous development in the fields of history and literature, deep integration of machine learning and digital humanities, the critical importance of digital resource construction, the advent of an era of comprehensive digital humanities platforms, and the emergence of collaborative projects across disciplines, institutions, and countries. This paper also proposes key recommendations to address current deficiencies in digital humanities projects: promoting inter-institutional cooperation and multidisciplinary integration, strengthening the cultivation of big-data interdisciplinary thinking and humanistic literacy, enhancing regional collaborative development, and continuously improving disciplinary service capabilities and fundamental resource construction.

Full Text

Preamble

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Analysis and Enlightenment of Digital Humanities Projects in Chinese Context—Overview of Project Selection at the 2020 Digital Humanities Conference (DH2020)

Shen Lili, Zhang Hongling, Han Chunlei, Liu Wei

Shanghai Library, Shanghai Institute of Science and Technology Information, Shanghai 200031

Abstract: [Purpose/Significance] This paper analyzes 51 digital humanities projects in Chinese context collected at the 2020 Digital Humanities Conference hosted by Shanghai Library, summarizing the general situation of digital humanities projects on Chinese cultural themes in the Chinese-speaking world to provide reference for the future development of digital humanities in China. [Method/Process] The 51 digital humanities projects were classified and studied using network survey and data analysis methods. Valuable features were obtained by analyzing and discussing the projects' research objects, research methods, infrastructure types, and practical significance of project outcomes. In-depth discussions were conducted across four dimensions: "Digital Humanities and Humanities Disciplines," "Technical Means and Methodological Applications," "Infrastructure Construction," and "Service Models and Problem Solving." [Result/Conclusion] The summary of 51 projects reveals five major characteristics: flourishing development in history and literature, deep integration of machine learning and digital humanities, critical importance of digital resource construction, the arrival of an era for comprehensive digital humanities platforms, and the emergence of interdisciplinary, inter-institutional, and international collaborative projects. This paper also proposes main suggestions to address current shortcomings in digital humanities projects: promoting inter-institutional cooperation and multidisciplinary integration, strengthening cultivation of big data cross-disciplinary thinking and humanistic literacy, enhancing regional coordinated development, and continuing to improve disciplinary service capabilities and basic resource construction.

Keywords: digital humanities; DH2020; digital humanities annual conference; Chinese culture; project analysis

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Digital humanities has been established in China for a full decade. During this decade, the domestic digital humanities field has been striving to catch up with global developments while also reflecting on the past and sorting out the present. The Digital Humanities Conference (DH2020) with the theme "Benevolence and

Excellence: Digital Humanities and Chinese Culture" was held in Shanghai in 2020. This conference deeply focused on Chinese issues in the digital humanities field, reflecting the latest research developments in China's digital humanities domain. The conference provided a high-level academic exchange platform for humanities scholars both domestically and internationally regarding technological achievements, disciplinary outputs, and development trends. During the conference, a call for submissions and selection of outstanding digital humanities projects with Chinese themes was initiated. The projects collected at this conference represent important practical achievements in digital humanities in the Chinese-speaking world over the past decade. Based on detailed application materials from each project, this paper systematically summarizes the current progress of digital humanities projects in Chinese context from four dimensions: research objects, research methods, infrastructure types, and practical significance, providing reference for digital humanities research and practice in China.

1 Literature Review of Digital Humanities Projects

Digital humanities (DH) originated from humanities computing [1] and has formed a new interdisciplinary research field with the development of emerging technologies such as computer technology, internet technology, and multimedia technology [2]. Since the 1990s, "humanities computing" has been widely applied to various objects including hypertext, audio, video, and digital maps, covering multiple fields such as history, art, and linguistics. The concept of "digital humanities" first appeared in 2001 and has rapidly developed with the emergence of technologies such as linked data and ontologies [3], presenting data-intensive characteristics. The conference provided a high-level, high-quality academic exchange platform for humanities scholars both domestically and internationally regarding technological achievements, disciplinary outputs, and development trends. During the conference, a call for submissions and selection of outstanding digital humanities projects with Chinese themes was initiated. The projects collected at this conference represent important practical achievements in digital humanities in the Chinese-speaking world over the past decade. This paper, relying on detailed application materials from each project, systematically summarizes the current progress of digital humanities projects in Chinese context from four dimensions: research objects, research methods, infrastructure types, and practical significance, providing reference for digital humanities research and practice in China.

Internationally, digital humanities has yielded rich achievements. There are over 183 research centers, digital humanities associations, teams, or laboratories related to "digital humanities" worldwide [4]. These research centers are mostly affiliated with universities or GLAM (Galleries, Libraries, Archives, and Museums) institutions, equipped with complete hardware facilities and comprehensive research capabilities. Notable research centers include the Yale University Digital Humanities Lab [5], MIT HyperStudio [6], Kyoto Digital Humanities Center for Literature and Arts at Ritsumeikan University, Japan [7], and the

University of Sydney Digital Humanities Research Group [8]. Digital humanities associations include the Alliance of Digital Humanities Organizations, the Australasian Association for Digital Humanities, the European Association for Digital Humanities, and the Japanese Association for Digital Humanities. These foreign research centers and digital humanities institutions have vigorously carried out numerous digital humanities projects, and their relevant practical experiences are worthy of reference and learning. Therefore, Chinese scholars have conducted some systematic reviews and summaries of international digital humanities projects. Deng Yaoran [9] studied 14 digital humanities projects in American libraries, summarizing their thematic hotspots and characteristics. Zhao Xueqin et al. [10] explored multiple top-ranked university library digital humanities projects in the United States, including the Timeline Traveler project (MIT), the Nuremberg Experiments project (Harvard University), and the Blue Mountain project (Princeton University), from perspectives such as project establishment, technology application, and exhibition services. Xu Tongyang and Gu Tingting [7] reviewed the overall situation of digital humanities projects in Japan, summarizing their characteristics in research themes, research depth and breadth, data openness, and research priorities. Xu Tongyang and Yang Mingrui [11] analyzed Australian digital humanities projects and found that they feature a system guided by government agencies, implemented mainly by university libraries, and secured by enterprises. Lin Zefei [12] conducted an empirical analysis of UK digital humanities projects using the DHcommons project database to analyze research hotspots. This demonstrates that Chinese academia has been tracking the development of foreign digital humanities projects in real time, particularly the digital humanities research dynamics in representative countries such as Europe, America, and Japan, while also providing references for China's digital humanities project work.

The vigorous development of international digital humanities project construction has also promoted the progress of domestic digital humanities research. Since the establishment of China's first digital humanities research center at Wuhan University in 2011, domestic universities and GLAM institutions have successively established relevant digital humanities research and working institutions, such as the Peking University Digital Humanities Center, Shanghai Library Historical and Cultural Big Data Center, Fudan University Institute for Humanities and Social Sciences Data, and East China Normal University Survey and Data Center. These institutions have undertaken the important tasks of domestic digital humanities project construction and development. Domestic scholars have also tracked and analyzed the development of these projects. Liu Wei and Ye Ying [2] conducted macro-level research and discussion on the overall methodology and theoretical structure of digital humanities. Gao Shenghan et al. [4] reviewed existing domestic digital humanities achievements through bibliometric methods, analyzing in detail the knowledge base, research hotspots, and research trends in this field. Cai Yingchun [13] studied the application of digital humanities in the construction of domestic characteristic resource databases. Su Min [14] focused on discussing research results of digital humanities services

carried out by domestic libraries, clarifying the development direction of digital humanities service research in Chinese libraries. Wu Liping [15] used bibliometric methods to review the role positioning of libraries in digital humanities services, research tools, education and training, and job training. Zhu Benjun and Nie Hua [3, 16] included analysis and review of some domestic digital humanities projects in their summaries of the first and second Peking University Digital Humanities Forums. Lü Lucheng and Han Tao [17] also introduced some digital humanities projects in their 2019 Library Frontier Technology Forum conference summary. This shows that current domestic digital humanities review research mainly focuses on discussion of methodology and theoretical structure, discussion of development directions and prospects, development of library digital humanities services, and construction of resource databases and platforms, with few comprehensive or thematic reviews of digital humanities projects in Chinese context. Existing project reviews are only included in conference summaries of previous sessions. Therefore, this paper will comprehensively review and analyze digital humanities projects in Chinese context based on the project collection and selection at the 2020 Digital Humanities Conference (DH2020), relying on project materials submitted by each project team (including websites, Apps, mini-programs, images, and videos related to system platform tool construction, resource database, and knowledge base construction).

2 Basic Information of DH2020 Collected Projects

2.1 Project Selection Process

The 2020 Digital Humanities Conference outstanding project selection adopted a combination of expert solicitation and self-registration by project teams, generating 76 candidate projects. The organizing committee sent inquiry letters about outstanding project selection intentions to the 76 candidate projects after preliminary verification of contact information for projects with uncertain selection intentions. After summarization, 26 projects ultimately participated in the outstanding project selection. Additionally, 25 digital humanities projects that did not participate in the evaluation were further sorted out, totaling 51 projects included in this conference review. The outstanding project selection set up four award categories: Best Project Award, Best Creativity Award, Best Art Design Award, and Best Theme Award, with 11 outstanding projects finally selected. Basic project information is shown in Table 1 and Table 2 .

2.2 Basic Project Analysis

From the perspective of project construction institutions' countries and regions, most Chinese context digital humanities project constructors are domestic institutions, with 3 projects involving overseas institutions (United States) and 1 independent project from Germany. Analysis of all domestically constructed projects in Figure 1 [Figure 1: see original paper] shows that approximately 63% (33 projects) come from Beijing (16 projects) and Shanghai (17 projects), reflecting that Beijing and Shanghai are currently leading regions in domestic

digital humanities research, producing more outstanding research achievements that have been recognized and affirmed by experts and scholars. At the same time, it was found that Taiwan region also attaches great importance to digital humanities project construction, with 6 projects recommended for evaluation, whose project construction achievements are widely recognized by scholars in the field.

From the perspective of project construction institution types shown in Figure 2 [Figure 2: see original paper], 51 projects involved 33 institutions in construction, including 19 universities (approximately 58%), 5 research institutions (approximately 15%), 5 public GLAM institutions (approximately 15%), and 4 commercial institutions (approximately 12%). Additionally, media organizations such as Xinhua Net participated. This shows that universities remain the "main force" in digital humanities project construction and implementation, while research institutions and public GLAM institutions are the vital forces in this field's construction, and commercial institutions enable the development of digital humanities field subjects to present a new trend of cross-industry and cross-institution collaboration, facilitating the implementation and promotion of digital humanities research achievements. Additionally, it should be noted that more and more universities, such as Peking University, Wuhan University, and Renmin University of China, have established digital humanities research centers and undertaken the role of project constructors. These centers demonstrate universities' emphasis on digital humanities as an interdisciplinary field. With the gradual establishment and improvement of digital humanities research centers in various universities, more outstanding research projects will inevitably emerge.

From the disciplinary distribution of projects shown in Figure 3 [Figure 3: see original paper], among the 51 projects, 24 projects focus on history (47%), 7 projects on literature (13%), and 5 projects on art (10%). This shows that history and literature remain popular disciplines in digital humanities research, while art has become a new focus. Additionally, the disciplinary distribution reveals that 9 projects involve multiple disciplinary fields, demonstrating that digital humanities research plays an integrative role in the interdisciplinary combination of humanities research and digital technology. Finally, it is worth noting that 4 interdisciplinary projects are participated in or led by library and information science disciplines, showing that libraries and information science departments are the backbone of digital humanities projects.

3 Digital Humanities and Humanities Disciplines: Research Objects of Digital Humanities Projects

Digital humanities projects represent the practice and integration of digital technology in the humanities field. Humanities research is transforming into a new model driven by data, forming a new paradigm of "digital humanities" research [18]. Researchers and research institutions in various humanities disciplines, including GLAM (Galleries, Libraries, Archives, and Museums) and other cul-

tural memory institutions, are constructing digital humanities infrastructure to support new research paradigms, knowledge production, and communication models [19]. Digital humanities projects are mainly distributed across disciplines such as history, literature, art, library and information science, linguistics, and sociology. Based on each project's research content and objects, combined with digital technology methods, this paper systematically reviews and summarizes research achievements in subfields such as digital history, digital literature, and digital art.

3.1 History Field

Among the 51 projects, history field projects account for the largest proportion. Through sorting project themes and content, they can be divided into three directions: digital process of cultural heritage, large-scale and semantic construction of historical literature data, and research and application of historical spatiotemporal materials. These projects not only bring new technologies and methods to traditional historical research but also deepen the core of historical research and broaden research perspectives.

3.1.1 Digital Process of Cultural Heritage In May 2020, the Central Propaganda Department clearly stated in the "Notice on Doing a Good Job in the Construction of National Cultural Big Data System" that it is necessary to "collect and sort out cultural heritage data by category, annotate the cultural genes of the Chinese nation for various collection data of national public cultural institutions, higher education and research institutions, and cultural production institutions, and extract the spiritual identifiers of excellent traditional culture contained in intangible cultural heritage records" [20], emphasizing the importance and necessity of digital heritage project construction. There are many domestic cultural heritage digitalization projects, and the digital work of cultural heritage cannot be separated from the joint efforts of various cultural institutions and all sectors of society. Among the projects collected in this call for submissions, 5 projects involve the theme of cultural heritage digitalization. Relevant characteristics are summarized from five perspectives: construction institution, cultural heritage type, main digital resources, main technologies, and application scenarios, as shown in Table 3 :

Table 3 Cultural Heritage Digitalization Projects

Project Name	Construction Institution	Cultural Heritage Type	Main Digital Resources	Main Technologies	Application Scenarios
Gaoxian Ancient Village Digital Memory	Renmin University of China	Intangible Cultural Heritage	Architectural space visual resources, digital genealogy, oral history, photos, good news reports, door plaques and couplets, paintings, village history, family instruction recitation recordings	Named entity recognition, domain ontology, front-end and back-end database construction	"Memory Gaoxian" portal website as a presentation and entrance for Gaoxian local culture and historical knowledge, showing stronger display effect, effectively avoiding information interference from other columns, providing immersive browsing experience for visitors, allowing them to quickly integrate into the ancient village cultural atmosphere

Project Name	Construction Institution	Cultural Heritage Type	Main Digital Resources	Main Technologies	Application Scenarios
Digital Dunhuang	Dunhuang Research Academy	Material Cultural Heritage	Cave information, mural information, audio and video programs	High-definition scanning, VR technology	Building a diversified and intelligent digital resource library for grotto cultural relics, establishing a digital asset management system and a scientific guarantee system for digital resources

Project Name	Construction Institution	Cultural Heritage Type	Main Digital Resources	Main Technologies	Application Scenarios
Reproducing Yuanmingyuan	Beijing Tsinghua Urban Planning and Design Research Institute	Material Cultural Heritage	Archaeological site records, Forty Scenes paintings and other digital archives, previous survey maps	Re-relic system, VR technology, 3D panoramic modeling	Virtual reproduction and comprehensive information management of architectural heritage, supporting academic research, archaeological excavation, protection projects, daily management, and public participation
Cultural Beijing Research	Renmin University of China	Intangible Cultural Heritage	Oral historical materials, image historical materials, manuscripts, letters, photos, physical objects	Special database construction	Organizing literature on major modern and contemporary Chinese events and important figures, forming multi-carrier, multi-type special literature resources

Project Name	Construction Institution	Cultural Heritage Type	Main Digital Resources	Main Technologies	Application Scenarios
Chinese Memory	National Library of China	Intangible Cultural Heritage	Pictures, local literature, resource maps, audio and video	Special database construction	Constructing and presenting the historical charm of "old Beijing" and the spiritual outlook of "new Beijing," building a digital Beijing memory

As shown in Table 3, the construction entities of cultural heritage digitalization projects include both public and university libraries, as well as research institutions like the Dunhuang Research Academy. The specific content of cultural heritage digitalization projects can be divided into material cultural heritage (including protected historical relics, historical buildings, and human cultural sites) and intangible cultural heritage (including oral traditions and expressions, performing arts, and traditional handicrafts) [21] based on cultural heritage types.

Relevant scholars have pointed out that cultural heritage digitalization projects have five specific characteristics: cultural, historical continuity, dispersion, complexity, and communicability [22]. Feng Huiling also pointed out in the Gaoxian Ancient Village Digital Memory project that integrity, cross-spatiotemporality, vitality, broad perspective, multi-dimensional narrative, semanticization, digital interpretation of traditional texts, and immersion are new directions for contemporary cultural heritage digitalization projects. Cultural heritage digitalization enables immovable cultural relics to break through physical space and geographical limitations, stepping out of the cultural relic ontology environment to present to the public. Through the combination of virtual and reality and the integration of art and technology, it creates a new digital cultural memory [23].

3.1.2 Large-scale and Semantic Construction of Historical Literature Data Large-scale digital processing of historical literature and semantic processing on this basis are fundamental works of digital history construction. The

main work involves annotating personal names, place names, product names, works, and event names scattered in historical materials and converting them into structured data, thereby forming large-scale knowledge bases and datasets that provide data foundations for subsequent humanities scholars' geographic spatial analysis, social network analysis, and bibliometric analysis. For example, the "Chinese Multi-generational Population Database (CMGPD)" by Li Zhongqing and Kang Wenlin's team at the Hong Kong University of Science and Technology has achieved tracking of long-term population records and multi-generational family changes by mining and constructing large-scale historical databases based on Chinese historical archives such as household registers and genealogies. The "Query System for Official Positions in the Qing Dynasty" by the Digital Humanities Center of National Taiwan University constructs a data system covering official positions, personal names, organizational systems, and superior-subordinate relationships from the 51st year of Qianlong to the 3rd year of Xuantong through the digitalization of "Official Position Tables of the Qing Dynasty with Biographical Records." The "Chinese Local Historical Documents Database" constructed by Shanghai Jiao Tong University Library contains about 350,000 local historical documents, building the largest full-text searchable manuscript literature database. The "Genealogy Knowledge Service Platform" constructed by Shanghai Library provides rich semantic genealogy data through linked data technology and knowledge graph technology, combined with linked open data such as personal name authority files, place name tables, and historical chronology tables, to build a global genealogy database with full volume, fine granularity, long time span, large spatial scope, and open data.

3.1.3 Research and Application of Historical Spatiotemporal Materials Historical geography project construction is another research hotspot in digital history field digital humanities projects. Such projects often assist in the construction of digital historical geography maps by combining historical materials and Geographic Information System (GIS) technology, revealing and simulating the evolution process of specific historical events under specific spatiotemporal sequences from multiple perspectives, and providing scientific research geographic data for relevant national research topics. Nanjing University's "AR Story Map of Japanese Military Comfort Stations in Nanjing" uses GIS technology and AR augmented reality technology to present Japanese military comfort stations in Nanjing in spatiotemporal order on an AR 3D map, combining them with historical materials of comfort stations to create an AR story map. In research on the historical theme of the Silk Road, the "Silk Road Historical Geography Information Open Platform" developed by the History School of Capital Normal University extracts scattered historical literature materials into historical data with spatial attributes and combines them with archaeological materials to build a visual map database covering humanities and scientific research data such as towns, transportation, culture, land reclamation, and ecological environment, providing scientific research informa-

tion consulting data for the country on the Silk Road. Fudan University Hou Yangfang's team's "Silk Road Geographic Information System" restores multiple routes including Faxian and Xuanzang's pilgrimage journeys and Gao Xianzhi's expedition through WebGIS, and annotates the distribution of ancient cities along the routes, achieving for the first time the precise geographical restoration of traditional Silk Roads on modern highways. Additionally, Taiwan region's "Academia Sinica" series projects such as "Taiwan Historical and Cultural Map (THCTS)," "Cultural Resources Geographic Information System," and "Chinese Civilization Spatiotemporal Framework (CCTS" all use WebGIS technology to establish 400 years of Taiwan's historical, cultural, and natural resource map information within a spatiotemporal application framework, demonstrating the historical development and environmental changes in the Taiwan region.

3.2 Literature Field

Literature field projects can be divided into two aspects based on the degree of digital processing of data resources: text processing and basic corpus construction, and text analysis and knowledge exploration.

3.2.1 Text Processing and Basic Corpus Construction In the literature field, the most direct and fundamental application of digital technology is the digitalization of texts and the construction of basic corpus databases. From project research, it was found that ancient literature digitalization projects account for the largest proportion in scanning physical documents. For example, Capital Normal University developed the large-scale ancient literature full-text retrieval database "Guoxue Baodian," and Zhonghua Book Company Gulian Company launched an ancient literature collation platform that aggregates a series of digital ancient book products such as "Chinese Rare Ancient Books Database" and "Chinese Literature and History Academic Works Database." The Yunnan Provincial Library's Yunnan Ancient Books Digital Library has completed the digitalization of ancient books from the Song Dynasty to the Republic of China period, including different versions such as printed editions, manuscripts, and handwritten copies.

3.2.2 Text Analysis and Knowledge Exploration On the basis of digital text processing of literature, many projects utilize technical means such as knowledge graphs, text analysis, and full-text automatic recognition to convert literature data into machine-readable data, conduct deep-level mining of text content, and reveal people, places, times, events, and relationships within them.

In the poetry field, Xinhua Net Data News and Zhejiang University Visualization Group's research team project "Song Ci: Lingering Sentiments, Where to Paint the Human World" takes "Complete Song Ci" as a sample and constructs a Song Dynasty poet travel route map and a chronological map of Song Dynasty poets' lives and eras through knowledge graphs and social network analysis. Simultaneously, it conducts word frequency statistics and common imagery statistics

of "Complete Song Ci" through text analysis, providing a new data-driven perspective for Song Ci appreciation. Beijing Normal University's "Tang Poetry Garden" platform focuses on Tang Dynasty poets and their works, using natural language processing technology to achieve large-scale knowledge mining of poetry themes, emotions, and poets, creating a full Tang poetry semantic retrieval and visualization platform based on knowledge graphs. Additionally, Tsinghua University's "Nine Songs—Computer Ancient Poetry Composition System" uses the latest deep learning technology, combining multiple specially designed poetry generation models, trained on over 800,000 poems created by human poets, to develop an artificial intelligence poetry writing system that has sparked interest in poetry creation.

In the modern newspaper and periodical field, the "Republic of China Period Periodical Corpus" project by the University of Chicago Text Optics Laboratory and Shanghai Library conducts metadata collection, subject indexing, and text OCR recognition work on some periodicals from the Republic of China era through semantic retrieval, classification algorithms, and text reuse technologies, and develops corresponding text analysis research tools to provide humanities scholars with multiple scales of "lenses" for reading and analyzing large-scale literature, achieving the goal of discovering various abstract cultural patterns through alternating between distant reading and close reading. Shanghai Library's "Historical and Cultural Big Data Platform" integrates characteristic collection resources such as modern newspapers, periodicals, books, genealogies, and manuscripts, using new technologies such as linked data, knowledge graphs, IIIF, machine learning, and GIS to support numerous digital humanities research methods and paradigms including statistical analysis, text analysis, social network relationship analysis, spatiotemporal analysis, and 3D modeling, supporting knowledge exchange models and application scenarios for different humanities disciplines.

In the ancient books field, the "Chinese Ancient Books Basic Data Analysis Platform" constructed by Shanghai International Studies University provides humanities scholars with text analysis tools and catalog retrieval and knowledge graph services for extant Chinese ancient books based on the aggregation of basic Chinese ancient books data including ancient book texts, dictionaries, and classic knowledge. The "Integration of Machine Intelligence and Crowd Wisdom in Ancient Books Data Practice" project constructed by the Survey and Data Center of East China Normal University provides methods and tools needed in ancient books data work such as full-text automatic recognition, automatic sentence segmentation, and automatic image-text indexing through the application of artificial intelligence technology in digital humanities and crowdsourcing collaboration models. The "Tang and Song Literature Chronological Map" project developed by South-Central Minzu University solves two major long-standing problems in ancient Chinese literature research—"scattered data" and "separated spatiotemporal dimensions"—and for the first time proposes the concept of "spatial-temporal integration," achieving the integration of literary information in space and time, objectively restoring the scenes where literature

occurred, and realizing the interaction between GIS and literature.

3.3 Art Field and Visual Communication

In the analysis of 51 projects, it was found that digital humanities is gradually playing a role in the art field. The digital presentation of seals, murals, and calligraphy/paintings provides great convenience for humanities and art research. At the same time, more and more digital humanities projects are paying greater attention to data visualization presentation and visual communication.

3.3.1 Data Visualization Data visualization is a product of the integrated development of modern technology and humanities arts. With the development of digital technology, the combination forms of images and data have changed and developed. Data visualization also provides new perspectives for research in the digital humanities field. The Chinese Ancient Royal Family Tree (Zhao Song, Li Tang, Zhu Ming) project designed and constructed by Tsinghua University team uses family relationship data from the Chinese Ancient Figures Relationship Database (CDBD) as a foundation, employs algorithms and visualization means to mutually judge and connect personal family relationships, and constitutes growing family trees in chronological order, discovering doubts in blood relationships. The construction work of Chinese ancient royal family trees not only reveals the internal characteristics of large families in history but also raises new questions different from traditional visualization.

3.3.2 Visual Communication and User Experience Some digital humanities projects not only make new attempts in the field of data visualization but also continuously absorb advanced UI design concepts in visual communication and user experience to more clearly reveal project themes, provide more comfortable interactive experiences, more clearly interpret data models, and achieve more intuitive visual transformation. The "Gaoxian Ancient Village Digital Memory Website" by Renmin University of China adopts a rare full-screen webpage structure in China, showing only one column's introduction and entrance per screen, demonstrating stronger display effect, effectively avoiding information interference from other columns, providing immersive browsing experience for visitors, and allowing the audience to quickly integrate into the ancient village cultural atmosphere. The "Historical and Cultural Big Data Platform" designed and developed by Shanghai Library also adopts a full-screen webpage structure and inserts video animations on the homepage, making the homepage display more intuitive and rhythmic. At the same time, it uses multi-screen dropdown to display multiple story scenes such as Shanghai brand, film memory, and red tourism, cyclically and dynamically demonstrating the rich resource content and characteristics of the historical and cultural big data platform, with interactive experience running through the entire browsing, input, and output process of story scenes.

3.3.3 Digital Presentation of Seals, Murals, and Calligraphy/Paintings

In this project analysis, it was found that digital humanities technology has made contributions in traditional art fields such as calligraphy/paintings, seals, and collections, bringing new directions for knowledge organization and presentation forms in these fields. The Dong Qichang Digital Humanities Display System developed by Shanghai Museum first introduced machine learning into calligraphy and painting research, relying on data association and quantitative analysis to visually display time, place, people, and events related to Dong Qichang, achieving detailed viewing of calligraphy and paintings and restoring an art ecosystem centered on Dong Qichang in the late Ming Dynasty, representing a new attempt at museum data visualization. The "Seal Collection: Fudan University Seal Documentation Virtual Library" constructed by Fudan University introduces the International Image Interoperability Framework (IIIF), adopts a Serverless architecture, constructs cost-effective large-scale image resource services, and reorganizes and displays the seal collection of Lin Zhangsong, owner of Songyin Studio and a scholar of epigraphy. The "Chinese Modern and Contemporary Calligraphy and Painting Printed Database" constructed by East China Normal University uses image resources as the main construction object, employs IIIF, linked data and other technical means, displays works by famous calligraphy and painting artists such as Dong Qichang and Feng Chaoran, and provides new functions for calligraphy and painting works appreciation and research such as content annotation, intelligent recommendation, and spatiotemporal analysis. Wuhan University has developed and constructed two Dunhuang mural-themed projects: one is the "IIIF-based Dunhuang Mural Digital Narrative System," and the other is the "Dunhuang Mural Subject Thesaurus and Linked Data Release Service Platform." The former takes the famous "Mount Wutai Map" mural in Dunhuang Mogao Cave 61 as a case study, uses IIIF technology, introduces the concept of digital narrative, deconstructs and reveals scenes of concepts and entities in the mural from five dimensions: people, events, time, place, and objects. The latter constructs a standardized and comprehensive domain subject thesaurus for Dunhuang murals, providing a controlled vocabulary set for deep semantic annotation, knowledge organization, information association, and sharing of Dunhuang mural digital resources, promoting the development of Dunhuang mural digital humanities applications.

3.4 Library and Information Science Field and Related Interdisciplinary Subjects

Many of the digital humanities projects in this conference are led by experts in the library and information science field and GLAM institutions such as public libraries, university libraries, and museums. These experts and institutions undertake the important task of promoting digital humanities infrastructure construction and development, making digital humanities a research hotspot in the library and information field and also giving rise to interdisciplinary and cross-disciplinary project topics between library and information science and

other disciplines.

3.4.1 GLAM Field Libraries, museums, and archives, as public cultural memory institutions accompanying the progress of human civilization, have natural missions to protect cultural heritage, preserve and provide information resources [24]. Therefore, the continuous advancement of digital humanities projects has accumulated a large amount of basic data, constructed comprehensive tool platforms, and built digital humanities education tools in the library and information field. In terms of basic data accumulation, the "Multi-source Heterogeneous Academic Achievement Big Data Fusion and Revelation Project" constructed by Fudan University proposes a solution for academic achievement big data, including complete processing mechanisms from data acquisition to cleaning to association mining and display, designing and establishing an interactive data cleaning process that can achieve manual calibration of key links. Shanghai Library's "SinoPedia: Linked Data Service Platform" lowers the technical threshold for using linked data, achieving semantic search (SOOOPA), data publishing (Linked Data Publishing, LDP), and graph presentation (Linked Data Visualization, LDV) for multiple datasets through convenient file configuration methods. Finally, disciplinary service is the basic service of libraries supporting discipline construction. Therefore, under the background of digital humanities, East China Normal University's distributed digital humanities research and teaching training environment takes digital local gazetteers as research content, integrating resources with research tools, research methods, teaching training, and method learning on one logical platform to construct a distributed digital humanities research and teaching training environment.

3.4.2 Interdisciplinary Subjects Digital humanities itself is an interdisciplinary field. Researchers in the library and information field serve as communication bridges between digital humanities and other disciplines. The development of digital humanities cannot be separated from the support of science and technology. With the diversification of digital humanities research objects and the interdisciplinary characteristics of research content, digital humanities research cannot do without the cross-use of technical means such as text analysis, social network analysis, spatial analysis, automatic classification, and interactive measurement in stages such as collection, discovery, collaboration, comparison, and publication. Digital humanities research can be divided by technology type into digitalization technology, data management technology, data analysis technology, visualization technology, VR/AR technology, machine learning technology, etc. [2]. These technologies realize basic resource processing, service system construction, application platform construction, intuitive image presentation, interactive environment creation, and intelligent service provision for digital humanities projects. Table 4 shows the statistical situation of methods and technologies adopted by these 51 digital humanities projects:

Table 4 Methods and Technologies of Digital Humanities Projects

Technology Type	Specific Methods and Technologies	Representative Projects
Digitalization Technology	Scanning, photography, 3D modeling, high-definition scanning	Digital Dunhuang, Chinese Local Historical Documents Database (Contract Documents), Yunnan Provincial Ancient Books Digital Library, Reproducing Yuanmingyuan, AR Story Map of Japanese Military Comfort Stations in Nanjing

Technology Type	Specific Methods and Technologies	Representative Projects
Data Management Technology	Ontology construction, database design, named entity recognition, semantic search, API data services, semantic description	"Chinese Historical Figures Database (CBDB) Online Query System Second Edition—User-oriented Redesign and Implementation," "Integration of Machine Intelligence and Crowd Wisdom in Ancient Books Data Practice," "Distributed Digital Humanities Research and Teaching Training Environment," "Dunhuang Mural Subject Thesaurus and Linked Data Release Service Platform," "Genealogy Knowledge Service Platform," "SinoPedia: Linked Data Service Platform," "CNKI Digital Humanities Research Platform," "Historical and Cultural Big Data Platform," "Local Gazetteete Database Project," "Republic of China Period Periodical Corpus," "Chinese Historical Figures Biographical Database (CBDB)"

Technology Type	Specific Methods and Technologies	Representative Projects
Data Analysis Technology	Text analysis, content mining, geographic information systems, social network relationships	Tang and Song Literature Chronological Map, Dong Qichang Digital Humanities Display System, Six Dynasties Jiankang Urban Historical Information System, AR Story Map of Japanese Military Comfort Stations in Nanjing, "Local Gazetteette Product Knowledge Base Construction and Deep Utilization Research," "Chinese Modern and Contemporary Calligraphy and Painting Printed Database," "Silk Road Geographic Information Open Platform," "Genealogy Knowledge Service Platform," "Beijing Memory," "Academic Map Publishing Platform," "Taiwan Centennial Historical Map," "Cultural Resources Geographic Information System," "Taiwan Historical and Cultural Map (THCTS)," "Tang Poetry Garden," "Historical and Cultural Big Data Platform," "Chinese Historical Figures Biographical Database (CBDB)," "Fudan University in the Anti-epidemic Fight" Special Digital Collection Platform

Technology Type	Specific Methods and Technologies	Representative Projects
Visualization Technology	Knowledge maps, scene simulation, information aesthetics	NTU Digital Humanities Center Constructed Digital Humanities Analysis System and Personal DH Research Platform, "Fudan University in the Anti-epidemic Fight" Special Digital Collection Platform, "Chinese Ancient Books Basic Data Analysis Platform," "Song and Yuan Case Studies Knowledge Graph Visualization System," "Genealogy Knowledge Service Platform," "Chinese Ancient Royal Family Tree (Zhao Song, Li Tang, Zhu Ming)," "Song Ci: Lingering Sentiments, Where to Paint the Human World," "Tang Poetry Garden," "Historical and Cultural Big Data Platform," "Historical and Cultural Celebrity Study Tour Footprint Knowledge Graph Construction and Visualization," "Open Knowledge Graph Alliance on the Chain"
VR/AR Technology	Virtual reality technology, augmented reality technology, gamified learning	Digital Dunhuang, Reproducing Yuanmingyuan, AR Story Map of Japanese Military Comfort Stations in Nanjing, Beijing Memory

Technology Type	Specific Methods and Technologies	Representative Projects
Machine Learning Technology	Deep learning, automatic classification, personalized services	"Local Gazetteette Product Knowledge Base Construction and Deep Utilization Research," "Historical and Cultural Big Data Platform," "Fudan University in the Anti-epidemic Fight" Special Digital Collection Platform, "Tang Poetry Garden," "Nine Songs—Computer Ancient Poetry Composition System"

From Table 4, it can be found that current digital humanities projects focus more on data management technology, data analysis technology, and visualization technology. In other words, the current focus of digital humanities projects has shifted from pure basic resource construction to the construction of digital humanities service systems, application platforms, and intuitive images. It has evolved from the initial data collection and discovery stages to stages including data collection, discovery, collaboration, comparison, and publication. This aligns with the general life cycle of digital humanities research and also means that information technology participates in different stages of digital humanities research in various forms, providing resources, tools, technologies, and communication platforms needed for digital humanities research.

Secondly, from Table 4, it can be found that more and more digital humanities projects are no longer simply using a certain type of technology or constructing a certain type of resource, but are gradually developing into comprehensive tools and research platforms with multiple resources, multiple perspectives, multiple methods, and multiple fields. They aim to provide technical support and solutions for humanities experts, encouraging them to use non-humanities research methods provided by the platform to understand and analyze their own datasets while solving traditional humanities discipline problems, and to share research achievements through tool integration platforms [3]. For example, the "Open Knowledge Graph Alliance on the Chain (OpenKG)" hosted by the Language and Knowledge Computing Professional Committee of the Chinese Information Processing Society of China is an open sharing platform for knowledge graph datasets, providing users with database API interfaces, retrieval query systems, pre-trained models, and other tool sets to help users build their own knowledge

graph data. Shanghai Library's "Historical and Cultural Big Data Platform" uses new technologies such as semantic web, linked data, knowledge graphs, machine learning, GIS, and visualization to integrate resources such as ancient books, genealogies, celebrity archives, manuscripts, modern books, newspapers, and periodicals, providing a "fertile ground" for discovering new problems and "new tools" for solving old problems for researchers.

5 Digital Humanities and Infrastructure Construction: Type Analysis of Digital Humanities Projects

Shanghai Library researcher Liu Wei et al. believe that digital humanities infrastructure is a type of infrastructure supporting humanities research activities, representing the basic conditions that must be met to conduct humanities research in the digital environment. Digital humanities infrastructure can be divided into three levels: its core consists of literature resources and their service institutions, providing basic research material guarantees; the middle layer is the main body of digital humanities research activities, composed of system platforms, tools and software, data resource construction repositories, foundations, domain experts, and data scientists; the periphery is the digital humanities research achievement publishing platform that interacts with scholars, users, and society, including data discovery platforms, visualization platforms, exchange platforms, and open publishing platforms [18]. Based on the "three-level" composition theory of digital humanities infrastructure, the detailed distribution of the 51 projects across hierarchical modules is shown in Table 5 :

Table 5 Type Analysis of Digital Humanities Projects Based on Infrastructure Construction

Infrastructure Level	Project Type	Project Numbers
Core Layer	Data Resource Institutional Repository	XM01, XM04, XM05, XM11, XM13, XM14, XM15, XM16, XM18, XM23, XM26, XM31, XM47
Middle Layer	System Platform, Tools and Software	XM02, XM03, XM04, XM06-XM12, XM14, XM17, XM19-XM22, XM25-XM30, XM32-XM40, XM42-XM45, XM48, XM49
	Data Resource Institutional Repository	XM05, XM24, XM41

Infrastructure Level	Project Type	Project Numbers
Periphery	Visualization Presentation Platform	XM03, XM25, XM46, XM50
	Data Analysis Platform	XM05, XM15, XM23, XM24, XM31, XM32, XM51
	SNS Exchange Platform	XM46, XM50
	Open Semantic Publishing Platform	XM46, XM50

From Table 5, it can be found that the 51 digital humanities projects involve various aspects of infrastructure construction with different emphases. The work of these digital humanities projects also promotes infrastructure construction. The interaction of multiple module factors across three levels forms a sustainable development organic whole, presenting the following three characteristics:

(1) Digital humanities infrastructure construction is still in the "accumulation" stage. The theme of this conference was "Accumulation and Transcendence," and currently digital humanities infrastructure construction is also in the "accumulation" stage. Digital humanities infrastructure construction is a long-term process. Currently, infrastructure construction in Chinese context still has shortcomings, with the vast majority of project types being digital resource construction, system construction, and platform and software development. Among the 51 projects, 40 are digital humanities-oriented resource database construction. Resource database construction includes both the processing of non-digital humanities materials into digital content and the construction of datasets that standardize and annotate non-structured digital text content according to certain usage purposes. Nineteen projects involve system construction and platform software development, such as the "Chinese Historical Figures Database (CBDB) Online Query System Second Edition—User-oriented Redesign and Implementation" hosted by Peking University and the "Multi-source Heterogeneous Academic Achievement Big Data Fusion and Revelation" hosted by Fudan University. Only two projects—"CNKI Digital Humanities Research Platform" hosted by Tongfang Knowledge Network and "Historical and Cultural Big Data Platform" hosted by Shanghai Library—involve all three levels of infrastructure construction, potentially forming a self-operating, continuously optimizing, and sustainable development organic whole. This also represents the direction for transcending based on continuous "accumulation" in Chinese context digital humanities work.

(2) Data resource and institutional repository construction is the focus and

hotspot of infrastructure construction. Among these 40 projects involving digital resource database construction, 22 projects have relatively narrow coverage of digital resources, belonging to the digitalization construction of special collection resources, namely special database construction. The construction objects of special databases are often data resources in a specific field or on a specific theme, usually based on a certain collection classic or focusing on a specific historical period or event for digitalization and data construction and services of related resources. For example, Nanjing Agricultural University's "Local Gazetteette Product Knowledge Base Construction and Deep Utilization Research" project conducts digitalization and semantic processing on approximately 30 million characters of "Local Gazetteette Products," constructing a knowledge base covering vocabulary, terminology, keywords, named entities, and spatiotemporal sequences. The "Song and Yuan Case Studies Knowledge Graph Visualization System" developed by Peking University Digital Humanities Center conducts deep mining and analysis of the Song and Yuan Case Studies, a monumental work of Neo-Confucianism, from both distant reading and close reading perspectives, narrating the evolution of teacher-student relationships and academic thoughts in the Song Dynasty. Nanjing University's "Six Dynasties Jiankang Urban Historical Information System" takes Jiankang (present-day Nanjing) during the Six Dynasties period as the spatiotemporal research scope, establishing a complete historical geography database of Six Dynasties Jiankang.

(3) Digital humanities infrastructure construction is an "enabler" [25]. Although the funding information of the 51 projects was not collected, Liu Wei et al. [18] pointed out that various foundations are important driving forces for digital humanities infrastructure construction and are themselves part of infrastructure construction. In China, more and more digital humanities projects have received funding from sources such as the "National Social Science Fund" and "Ministry of Education Philosophy and Social Science Research Fund," thereby attracting more domain experts to participate in digital humanities project construction. Additionally, universities, research institutes, and GLAM institutions, as core factors of infrastructure construction, have established digital humanities research centers and serve as construction entities to preside over digital humanities project development, such as Renmin University of China's "Gaoxian Ancient Village Digital Memory Project," Wuhan University's "IIIF-based Dunhuang Mural Digital Narrative System," Peking University's "Song and Yuan Case Studies Knowledge Graph Visualization System," and Shanghai Library's Historical and Cultural Big Data Platform. These institutions provide assistance for data sharing, institutional collaboration, and personnel training for various humanities research projects while ensuring basic research materials, and also provide channels and platforms for academic exchange, open access, collaborative construction and sharing, and disciplinary integration development, promoting the quantification and

scientification of humanities and social sciences research.

6 Service Models and Problem Solving: Practical Significance of Digital Humanities Projects

In the expert debate session of the 2020 Digital Humanities Conference, experts unanimously agreed that digital humanities infrastructure construction cannot replace humanities research itself, and its significance lies in promoting the development of humanities research [25]. From the above analysis, it can be seen that current digital humanities project work in Chinese context basically belongs to the category of infrastructure construction. That is, digital humanities projects promote the development of humanities research and achieve their practical significance by solving practical problems in research for digital humanities scholars and even traditional humanities scholars, providing resource material guarantees and tool platform computing facility services. This is mainly reflected in the following three aspects:

(1) Digital humanities projects solve scholars' practical problems in basic research material guarantees, data processing, and software learning. Currently, many humanities scholars spend a lot of time on data collection, processing, and software technology learning in their research. The large amount of digital resource construction and tool software development involved in projects can provide basic research materials for scholars, help them with data processing, free scholars from complex data organization and processing work, enable better investment in their disciplinary field research, improve research efficiency, and promote disciplinary development. Additionally, attracting humanities scholars to participate in digital humanities project work allows for full understanding of humanities research needs at various project stages, constructing resource databases, tool software, and system platforms that better meet the needs of humanities research scholars.

(2) Digital humanities projects provide scholars with services for open data application and personalized research support. On one hand, tools or platforms developed by some projects and open digital resources constructed can be utilized and further developed and optimized by other projects, completing continuous iteration of digital resource construction, effectively promoting secondary utilization of information resources, creating new "data value," and providing humanities scholars with "data-driven" services based on this. For example, the "Historical and Cultural Celebrity Study Tour Footprint Knowledge Graph Construction and Visualization" project by Shanghai University and the "Chinese Ancient Royal Family Tree (Zhao Song, Li Tang, Zhu Ming)" project by Tsinghua University both utilize existing open data achievements for re-research in art and history fields. Both projects introduce character data from CBDB in their research, bringing new vitality to traditional historical and humanities research and providing new concepts and perspectives for scholars

in art and history fields. On the other hand, some platforms and systems support personalized research for humanities scholars in processing data, building databases, and combining tools and datasets from different sources. For example, the "NTU Digital Humanities Center Constructed Digital Humanities Analysis System and Personal DH Research Platform" provides tools for processing personal data, one-click database establishment, analysis and visualization tools, and personal corpus services. The "Fudan University East Asian Language Data Center" project provides custom language condition language geographic information queries and user-uploaded data mapping systems to meet personalized usage needs of experts and scholars. These platforms and systems greatly facilitate researchers' scientific research activities, providing humanities scholars with a series of resources, tools, and services related to humanities disciplines, helping scholars establish personal academic archives, making platforms bridges for sharing and disseminating digital humanities information, and meeting the diverse needs of humanities scholars.

(3) Digital humanities projects have practical significance in assisting new liberal arts construction and promoting Chinese cultural inheritance. On one hand, with the release of the "New Liberal Arts Construction Declaration," China's humanities and social sciences research has officially entered a new historical period, and the "fourth paradigm" of data-driven research has been widely advocated in humanities research fields. Wang Lihua and Liu Wei [26] used the "Digital Humanities Stack 2.0" theoretical model to provide a disruptive disciplinary paradigm for new liberal arts, pointing out that digital humanities provides corresponding support points and reference elements for new liberal arts construction from five levels—institution, composition, method, system, and interface—and two dimensions of entity and spirit. The achievements of digital humanities projects, such as datasets, tools, systems, and visualization works, can all be regarded as important presentation forms of digital humanities and even new liberal arts achievement exchange under the background of new liberal arts construction. On the other hand, digital humanities project construction also promotes the inheritance of Chinese culture. As the theme of this conference, "Accumulation and Transcendence: Digital Humanities and Chinese Culture," digital humanities projects in Chinese context should include the Chinese humanism centered on "benevolence" and the "Six Arts" of Confucianism as representatives of humanities disciplines and spiritual accumulation, thus having unique connotations. Many projects have successful practical experience in historical and cultural research, such as the "Gaoxian Ancient Village Digital Memory Website" hosted by Renmin University of China, the "IIIF-based Dunhuang Mural Digital Narrative System" constructed by Wuhan University, the "Dunhuang Mural Subject Thesaurus and Linked Data Release Service Platform" project, the "Chinese Historical Figures Biographical Database (CBDB)" project participated in by Peking University, and the "Tang and

Song Literature Chronological Map" project developed by South-Central Minzu University. These projects use digital humanities theories, methods, and technologies to protect, inherit, construct, and present Chinese culture and memory, making contributions to Chinese culture research.

Through reviewing and summarizing the 51 projects, the following main development trends of digital humanities projects in Chinese context were discovered:

(1) History and literature are flourishing disciplinary fields in digital humanities research. In these two disciplinary fields, technologies such as geographic information systems, social network analysis, and text analysis are widely applied. The linguistic arts discipline is a new field for digital humanities project construction, and data visualization technology as well as excellent visual communication have also received much attention from digital humanities project constructors.

(2) Machine learning, VR/AR technology combined with digital humanities has huge space. As new information technology methods, VR/AR technology and machine learning (especially artificial intelligence technology) have begun to be introduced into digital humanities projects, deriving new research directions and application scenarios such as automatic poetry composition, automatic ancient book recognition, story maps, and gamified learning, providing new services and experiences for both humanities scholars and ordinary users. Virtual reality and machine learning will be new hotspots in digital humanities research.

(3) Digital resource construction remains a top priority in digital humanities infrastructure construction, which is also the natural mission of GLAM constructors. Among them, special database construction for special collection resources is the key work in digital humanities infrastructure construction. The objects and content of digital resource construction have also evolved from single text data to the construction of unstructured data, audio-video, and image data.

(4) The era of comprehensive digital humanities platform development and construction has arrived. Based on the development of a certain type of resource or tool, project developers have begun to build comprehensive digital humanities platforms that integrate multiple digital resources for unified services, shared multiple tools, and provide services for humanities scholars' research collaboration and achievement publication. Shanghai Library's "Historical and Cultural Big Data Platform" and CNKI's "Digital Humanities Research Platform" are leaders in this regard.

(5) Interdisciplinary, inter-institutional, and international collaborative projects have begun to emerge. As an emerging interdisciplinary field, digital humanities presents new trends of cross-disciplinary integration of research methods, in-depth exchange of content concepts, and diverse presentation of research achievements with traditional disciplines such as literature, history, art, linguistics, and computer science. At the

same time, project constructors also present a collaborative model across institutions, regions, and countries.

At the same time, the research also found the following shortcomings in the current construction and development of digital humanities projects, requiring targeted planning for future digital humanities project development:

(1) Insufficient degree of literature resource datafication. This includes insufficient text acquisition, copyright monopoly, and insufficient open access. Unstructured text resources limit humanities scholars' research and constrain the development depth of digital humanities projects. While continuing to strengthen digital resource infrastructure construction, efforts should be made to encourage opening digital resources to scholars, strengthen inter-institutional cooperation, and avoid duplicate construction.

(2) Insufficient degree of multidisciplinary cross-integration. Although the trend of interdisciplinary integration has begun to emerge, the boundaries of digital humanities disciplines remain blurred, resulting in the two dimensions of humanities research digitalization and digital technology humanization not being well integrated, failing to play a bridging role in the interdisciplinary combination of humanities research and digital technology. Therefore, multidisciplinary cross-integration should be strengthened to enable more domain experts (domain experts, data scientists, algorithm engineers) to participate in digital humanities project construction.

(3) Insufficient scientific training in research tools and data utilization. Although comprehensive digital humanities platforms have begun to emerge, there is still a lack of comprehensive and systematic digital humanities training platforms and cases. Various institutions need to strengthen the cultivation of big data cross-disciplinary thinking and humanistic literacy, triggering scholars' exploration and thinking about new digital technologies and presentation methods.

(4) Mismatch between digital humanities infrastructure construction and digital humanities research development. Continue to improve disciplinary service capabilities and basic resource construction. Infrastructure construction should keep pace with the times and rely on innovations in various disciplines. At the same time, expand new research areas in the humanities field, respond to the Ministry of Education's call for new liberal arts construction, and promote the systematization and maturation of digital humanities research field theories.

(5) Unbalanced regional development. Projects hosted by institutions in first-tier cities account for more than half of the total, with Shanghai and Beijing being the leading regions in domestic digital humanities research. The level of digital humanities project construction in central and eastern regions is higher than in western regions, with Jiangsu, Zhejiang, and Hubei being the second-tier regions for domestic digital humanities project

construction. Hong Kong, Macao, and Taiwan regions, especially Taiwan, attach great importance to construction and investment in the digital humanities field. Regional development imbalance is not only a reflection of differences in economic and social development but also results from the uneven construction awareness and actual investment of universities and GLAM institutions as the main bodies of digital humanities project construction. The Digital Humanities Professional Committee of the Chinese Society for Library Science, initiated and established during the conference, has achieved remarkable work effectiveness, with member units developing rapidly. In just half a year, 13 digital humanities institutions such as the Digital Humanities Studio of the History and Archives School of Yunnan University have joined. Developing and uniting more digital humanities institutions and organizations from different regions, especially from other regions such as central and western China, to join the Digital Humanities Professional Committee and promote research and exploration of digital humanities projects and related fields in other domestic regions, and strengthening coordinated regional development are also among the committee's work objectives.

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Analysis and Enlightenment of Digital Humanities Projects in Chinese Context—Overview of Project Selection at the 2020 Digital Humanities Conference (DH2020)

Shen Lili, Zhang Hongling, Han Chunlei, Liu Wei

Shanghai Library, Shanghai Institute of Science and Technology Information, Shanghai 200031

Abstract: [Purpose/Significance] This paper analyzes 51 digital humanities projects in Chinese context collected at the 2020 Digital Humanities Conference hosted by Shanghai Library, summarizing the general situation of digital humanities projects on Chinese cultural themes in the Chinese-speaking world to provide reference for the future development of digital humanities in China. [Method/Process] The 51 digital humanities projects were classified and studied using network survey and data analysis methods. Valuable features were obtained by analyzing and discussing the projects' research objects, research methods, infrastructure types, and practical significance of project outcomes. In-depth discussions were conducted across four dimensions: "Digital Humanities and Humanities Disciplines," "Technical Means and Methodological Applications," "Infrastructure Construction," and "Service Models and Problem Solving." [Result/Conclusion] The overview of 51 projects reveals five major characteristics: Digital Humanities is flourished in the fields of history and literature, and has deep combination of machine learning. The construction of digital

resources is still the top priority. The era of Comprehensive Digital Humanities platform has come, and interdisciplinary, interinstitutional and international cooperative projects have also begun to appear. In view of the shortcomings in the construction and development of Chinese Digital Humanities projects, this paper also puts forward the main suggestions to promote inter-agency cooperation and multidisciplinary integration, to strengthen the cultivation of big data cross-thinking and humanistic quality, and to continue to improve the subject service ability and basic resources construction.

Keywords: digital humanities; DH2020; digital humanities annual conference; Chinese culture; project analysis

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