Supporting Digital Humanities Research: the Innovative Approaches of Libraries

Yulian Wang
Library of Jianghan University, 430056, Wuhan, China
E-mail: 623669313@qq.com

Abstract. With traditional humanities researches and modern digital technologies combined, Digital Humanities (DH) has come to the fore in recent years, an emerging field of library service studies. With the case study method, the article summarizes the research methods and characteristics of Digital Humanities. Also, it analyzes the impact Digital Humanities poses on libraries, and in turn, libraries could contribute to the “life cycle” of Digital Humanities researches in the light of data navigation, data mining, metadata management, and data publishing support, data security and retention and data literacy education. Methods discussed in the article could be employed by the library of Jianghan University, in hope of lifting the standard of Digital Humanities services.

1. Introduction
Digital humanities (DH), an abstract term, are in reference to ‘a series of scholar activities at studying the humanities as well as humanity-oriented issues, with the help of digital technologies.’ Traced back to the late 1940s, “Humanities Computing” sat at the crossroads of Arts and Sciences, integrating digital technologies such as digitalization, geographic information system, statistical analysis and visualized computing into the humanities researches and into the teaching process.

Digital Humanities offers new tools, new methodologies as well as a creative paradigm to the traditional humanities researches, and binds digital technologies, say, text mining, multimedia publishing, digital library, information visualization and virtualization with the traditional humanities researches and the teaching process, thus bringing about revolutionary changes. Digital Humanities, at the core, is to foster knowledge and research innovations with digital technologies and tools. It would produce a long-term change to the energy density of the humanities.

2. The Applications of Digital Humanities
The combination of digital technologies and the humanities researches starts a craze among scholars. A range of institutes for Digital Humanities—for example, The Alliance of Digital Humanities Organizations and The Society for Digital Humanities—have been established. Also, some universities have set up their research centers for Digital Humanities, such as the Yale Digital Humanities Lab and the Department of Digital Humanities at King’s College London. In China, the first research center of this kind is founded in the Wuhan University. Moreover, the Coordinated Innovative Center for Cultural Heritage and Digital Preservation, with the joint establishment of the Sun Yat-Sen University, the Central China Normal University, the Xiamen University and the Harbin Institute of Technology, is a cross-regional center for Digital Humanities nationwide.

On the basis of text mining, mining technology could dig into texts and analyze them intelligently. ‘Tang Poetry Analyzing System’, for instance, has found and excavated information deeply. The system, on the ground of indexing, improves the depth and correlation between texts.
Visualization could display and extract information. ‘China Biographical Database’ (CBDB) has processed the biography concerning historical figures digitally and comprehensively. Also, the database, combined with geographical information, is able to manifest visualized data, with which, researchers might carry out analyzing work in different angles.

Equipped with Geographic Information System (GIS), a growing number of scholars begin to probe into visual display of historical events in a static as well as dynamic way. Chinese Civilization in Time and Space (CCTS) creates a research application environment that has precise spatial positioning, integrated time and space attributes.

3. The Effects of Digital Humanities on Library

Digital Humanities gives rise to digital collection, with which, the library could operate intelligently, alter resource structures and accelerate the spread of information, thus building a new platform for knowledge service. According to the survey by The Association of Research Libraries (ARL) on 64 libraries in 2011, 48% of them lend scientific support to Digital Humanities projects. On June 2014, ACRL noted that the library of universities plays a pivotal role in the sustaining development of Digital Humanities, a contributor to the implementation of many Digital Humanities projects such as building the Data Warehouse, making metadata for collection and resources and maintaining and preserving digital archives.

![Figure 1. The annual distribution of Digital Humanities studies supported by foreign and domestic libraries over the past ten years.](image)

4. The Approaches to Serve Digital Humanities

With the ever-increasing share of digital resources, library, grounded in resource integration on digital platform, could embed data navigation system in Digital Humanities, as to provide services—in the aspects of download, analysis, modeling and visualization—to Digital Humanities researchers in a more interactive way. The library of the University of North Carolina at Chapel Hill starts off Doc South Data services, an extension of the school’s Digital Humanities project ‘Documenting the American South’.

4.1. Digital Excavation

Digital Humanities researches require scholars to analyze a variety of texts to find their shared characteristics, extract key points, identify their correlations and reveal the culture, mode and rules behind. The library of universities, with practical experience, has an advantage of data excavation and analysis—in concrete terms, they are information extraction, document categorization, statistical data analysis and trend forecast. Learning from empirical projects of Digital Humanities in China, data correlation and visualization lay somewhere at the heart of processing and displaying humanities archives and other cultural heritages. The genealogy service platform put forward by the Shanghai Library has made connections between the concepts of people, places, times and issues, and
manifested the data exchange by visualization, thereby contributing to data recycling as well as data sharing.

4.2. Metadata Management
Digital Humanities projects bear fruit, the achievements mainly in terms of manuscript, portfolio, text, corpus, picture, audio and video. To ensure the research data can be read and explained, the related metadata should be processed in a normal and standard way. The metadata services the library could offer to Digital Humanities projects are, in general, grouped into three parts: firstly, metadata consultation and assistance. It includes applying metadata standards, setting a framework of metadata to meet the demands of projects, and improving the efficiency of data retrieval. Secondly, description of basic attributes of data, definition of data correlation and design of data-related mechanisms. At last, organization, encoding and acquisition of data.

4.3. Supports for Data Publishing
Academic publications function as informing, saving and disseminating the research achievements. During the research process, the typical area the library contributes to is digital archive which concerns textual scan, Optical Character Recognition (OCR), Extensible Makeup Language (EML), XML editor and text encoding.

Supports for Digital Humanities Publishing given by the library of University of Illinois Urbana-Champaign include aided instruction, outreach and operating guide. The library also collaborates with WordPress, Omeka, with the aim of building an open platform of digital publishing services in free charge.

4.4. Data Security and Retention
Not confined to traditional ways to guarantee cyber security, encryption and protection of intellectual property and of privacy also carry a lot of weight. In line with the features and demands of specific project, library could offer security guidance, strengthen copyright consciousness as to ensure the sustainability of using and disseminating Digital Humanities productions.

Given that effective retention is prerequisite for data re-utilization, library is able to work together with developer in light of standard application and metadata management, as to optimize the retention of data resources. Also, they could integrate data retention into the early design of projects, thus largely enhancing the practicability.

4.5. Data Literacy Education
The technique is key to Digital Humanities researches, yet most of which is unknown to scholars in related fields. According to the characteristics of Digital Humanities, library might insert data literacy education into Digital Humanities in ways of holding related lectures, workshops, on-line classes—particularly MOOCs.

Librarians are playing an increasing role in Digital Humanities researches, who are required to study continuously and take part in training programs due to emerging techniques. Columbia University Library (CUL), to support the development of Digital Humanities, has launched ‘The Developing Librarian Project’ in a two-year term.

5. Conclusion
With the booming Digital Humanities programs, a large number of literature resources, digital technologies as well as professional scholars give the library a competitive edge in grabbing new opportunities. Library should create a good atmosphere for Digital Humanities researches, insert its supporting services into the research cycle, take an active part in seminars held by related organizations such as THATCamp, take advantage of social media and internet, and get aware of the work and demand of related researchers. Moreover, it is necessary for library to keep abreast of the latest trend, be conversant with digital tools—for example, DiRT—and their applications, as well as improve the quality and accuracy of Digital Humanities services. The library of Jianghan University affords services to Digital Humanities researches such as Excellent Art Works of Jianghan University...
and Cultural Database of Wuhan in terms of digitalization, metadata management and data retention, enhancing the quality and accuracy of Digital Humanities services.

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