

Experts column on digital humanities: unlocking potential of DH by riding the tide of digital transformation: the dialog between Wei Liu and Xuemao Wang

Participants:

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Host:

Dr. Jiale Ren

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Before this workshop, a list of eight questions proposed by several experts, delineating topics about digital humanity and digital transformation, was presented by the host. However, during the dialog, Dean Wang and Dr. Liu suggested a more constructive and unstructured way to discuss the theme. Therefore, the workshop was changed into a dialogue between these two scholars.

L: I think the listed questions are inclusive but confined to the digital humanities (DH). The journal *Digital Transformation and Society* centres on digital transformation (DT). In fact, I think Wang is familiar about DT in academic circles and colleges and universities in the US. He talks about digital scholarship all the time. I think a variety of new DT-centred topics can be discussed in areas such as education, scientific research, society and art. For instance, e-science, which is neither a topic in the DH nor in the digital social science field, is mostly explored in Europe.

Moreover, I think few topics are available to be discussed in the DH field at home and abroad since little progress has been made in the field.

W: I agree. Let us start the conversation on DH and extend the topic to DT, which covers a wider range. I saw robots in a row from the photos of Shanghai Library East. Have robots been applied to providing reference services there?

L: Smart libraries are hot in China, ushering digital libraries into a whole new stage. Digital libraries, depending on IT and digital resources to provide services online, are influential in the process of library transformation. Along with the advancement of IT in the era of artificial intelligence (AI), smart and intelligent technologies are encouraged to be widely adopted in libraries in China. On one hand, AI is applied comprehensively to systems



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such as acquisition, automation of bibliography and entity recognition. On the other hand, intelligent technologies adopted in e-commerce such as the data middle platform, reader profiling, resource profiling, precision push and reading promotion are used widely across library services.

More requirements are demanded on our platform as traditional systems, for example, IOS instant management system, cannot catch up with the changes. The Future of Libraries Is Open (FOLIO) is applied to replacing traditional library management systems. The Library of Congress has announced recently to use the FOLIO platform.

Regarding in-library services, it has been underlined frequently that a variety of face-to-face activities such as science popularisation and makerspaces must be held in libraries to highlight the necessity for libraries in the society. What have been adopted widely across China-based libraries are the Radio Frequency Identification (RFID) system, smart bookshelves, book checking robots, robot navigation and reservation. Those applications are rooted in a unified backstage management system.

Robots have been applied to providing reference services for a while. In addition, AI has recently made rapid progress towards natural language processing. Self-services become common across co-centres. Libraries are considering promoting those technologies too.

Digital humans, being AI-powered human-like virtual beings, are created in the metaverse. Shanghai Library is working on a digital human serving as a 3D librarian that can answer questions autonomously. The 3D librarian is more advanced than those robots providing reference services, which are enhanced with the capability of automatic speech recognition.

In addition, in Shanghai Library, the robots offering reference services are loaded with answering engines with the knowledge base in the cloud. They are rooted in a unified backstage management system to make sure their answers are consistent.

Meanwhile, these robots have their unique features respectively. Shanghai Library has spent over RMB 10 million to buy 20-plus robots in numerous forms, such as automated guided vehicles capable of automatic loading of books. Furthermore, robots can be designated into various types in line with their forms like robot receptionists. These robots will be loaded with different functional modules of the backstage software. Currently, the adopted robots are divided into different types by whether they carry a bookcase or not.

Robots have been manufactured massively in China, bringing down the cost accordingly. Their mechanical components, driving systems, software and sensors can be combined at will. Four-legged robots are costly. These robots are expected to be put into use once their prices drop to the affordable level.

Smart libraries are an inevitable trend in China in order to save labour. In Shanghai Library, eight robots serve as librarians and can answer frequently asked questions. They are popular, attracting readers at all ages. In fact, this technology is not mature yet and these robots may be at a loss amid the noisy environment. To cope with that, these robots are loaded with a touchscreen. Readers can click the touchscreen to get accurate answers.

Thanks to the RFID system, readers can use robots to return or borrow books directly. What is more, readers can reserve library seats, on which e-ink screens are installed. Readers with reservations can scan their QR codes to sign in. They can also reserve books, and robots will then carry the books to their seats after they sit down in the library.

Technologies have been iterated constantly with regard to library innovation. However, they are far from being satisfactory. Along with the opening of Shanghai Library East, I think the smart systems with applications such as navigation and reservation could be further enhanced. That said, they are well appreciated by our readers.

W: I think smart libraries can be classified as a topic under transformation in DT. They are popular in China due to multiple reasons, such as the development of big data and AI and

the low cost on robot manufacturing. I believe robots are applied more widely in China-based libraries than in US-based ones. Currently, robots may have already been used in US-based public libraries such as Palo Alto City Library. Academic libraries in the US have been simply using robots for book retrieval such as the one in University of Chicago. The issue about how to adopt the robots in our human-centric workflow such as reference and consultation has just started to get attention across academic libraries.

Next, I will focus on DH trends in the past decade and what the emerging field will look like in the global setting.

The DH trends in the past are distinct. DH emerged by application of computational and new media tools and has evolved on the basis of visualisation, new learning and research methods, big data and machine learning (ML)/AI. However, I think DH has focussed on humanity issues since the very beginning such as ancient classics and other aspects, whether in Chinese and western languages, resulting in a slow development with no breakthroughs in the past five years. As far as I am concerned, the DH movement had a good start but owing to excessive concentration on humanities rather than on more interdisciplinary and grand challenge issues, DH gradually lost its vitality and impact.

What are stressed in the US colleges and universities are a variety of interdisciplinary research and focus on global challenges such as climate change, sustainable energy and social justice, etc. However, humanities, with its tradition of narrowed and solo approach of focussing on humanities research, have lacked broad integration with the interdisciplinary research and have not been able to articulate its distinct human-centric contributions to the interdisciplinary research. I think whether it is traditional or particularly new, DH subjects need to be embedded in the interdisciplinary research to enable DH to make prominent progress and impact further. It is not common yet but we see more coming to integrate human-centred approach with AI/ML-backed support in STEM fields such as biomedical sciences and bioeconomic-bioinformatics. It is widely acknowledged in the Silicon Valley that current AI-driven movement lacks humanistic consideration, which is the strength of DH. Hence, to bolster the DH discipline's development to a higher level and to add humanities strengths into the interdisciplinary fields, DH must be extended to other fields to enable DH to give full play in its advantages in humanities.

L: I think what Wang said is insightful. DH boasts itself as the interdisciplinary research but is restricted to arts and humanities exclusively with the help of advanced technologies. It fails to generate any new thinking or disciplines.

It is said that a plenty of new subjects come into being amid cultural phenomena occurred in the digital age. Some of them may be beyond the reach of existing disciplines. However, DT caused by digital technology advancement has penetrated little human-centred studies and social research. Few research or teams focus on studying humanities or ethics in engineering or natural science fields such as AI.

DH's history is clear. It was renamed DH from humanity computing during the period 2001–2004. DH-related activities had been those organised by institutions and magazines before 2004. In 2004, Susan Hockey from University College London published a paper to summarise comprehensively DH's development. In the paper, Father Roberto Busa is regarded as the founder of DH or humanity computing. Moreover, the paper also summarised DH's penetration in fields such as computational linguistics and quantitative history research.

DH's development was vivid during 2004–2014, too. Professor Melissa Terras, who used to work at University College London and is a Turing Institute Fellow, is a renowned scholar in DH. She released a report in 2014 to analyse DH's development during 2004–2014.

Eight years have passed since 2014 but it seems that scholars who are interested in DH failed to expand further or attract a greater number of new scholars. In around 2016, it was

mentioned that DH was inclusive but lacked core academic communities, weakening its momentum for the future. Rarely did US scholars focus on DH-centred theoretical studies. European scholar David Barron published a book, in which DH is studied from the perspective of cultural criticism. The book's Chinese version is also available now. Alan Liu from UC Davis, an influential scholar in the DH field, has been engaged in infrastructure studies. On the whole, DH is recognised as a research field instead of a discipline overseas. It is short of academic communities, research focusses and influential scholars to guide its development in the future, resulting in research stagnation.

DH research began in China in 2011 along with establishment of the Centre for Digital Humanities in Wuhan University. Little progress was made in the first few years; till 2017–2018 research started to explode in China, which began to be recognized overseas. The DH research in China focusses on discipline construction, methodology and professional studies, respectively.

Regarding DH's discipline construction, Wuhan University offers training courses. Nanjing University launches the master of DH programmes for overseas students. Renmin University of China is the first China-based university having masters and doctoral degree programmes in DH, while the discipline has not been recognised by Ministry of Education yet. So far, China-based colleges and universities have been devoted to constructing new liberal arts. DH has been introduced to the primary discipline information resource management under the library and information science major.

Two DH academic committees have been established under Chinese Information Society of Social Sciences and the China Society of Indexers, respectively. *Journal of Digital Humanities* (quarterly) is jointly sponsored by Tsinghua University and Zhonghua Book Company and *Digital Humanities Research* is released by Renmin University of China.

Rapid progress has been made with regard to methodological research in DH in China. A considerable number of DH-centred papers are released in fields of memory institutions such as libraries, archives and museums. On the contrary, few papers are about DH research in conventional disciplines of arts and humanities such as history, philosophy, literature and linguistics. In comparison, such research is a hot topic overseas.

Professional studies in DH have just emerged in China.

To boost DH development further in China, I think a strong theoretical foundation is essential. The research must be classified distinctly into theoretical, methodological and professional DH to make more profound progress.

DH's penetration in arts and humanities falls behind the rapid IT development. Memory institutions, rooting in arts and humanities, have been dedicated and contributed heavily to development of DH. However, DH failed to attract wide attention from other fields such as computer science. Nor does the field contain a high business value. In the future, DH's development pace will be synchronised at home and abroad. China-based memory institutions will digitalise data via approaches such as digital library construction. It is hoped that revolutionary achievements will be made in DH in the future.

W: I agree that few disruptive innovation or breakthrough has been achieved with regard to DH in recent years. Nor does the discipline have any strong momentum. DH's history and exclusive applications in humanities studies have already been summarised clearly and broadly. What needs to be solved strategically is the discipline's continued advancement and progress. I think the slow progress is related to broad challenges of humanities studies. Humanities-related research studies and academic disciplines in many western universities are shrunk in terms of funding, student enrolment and faculty hiring. The outlook is not so encouraging. That said, the humanities-related disciplines are indispensable to any comprehensive universities or liberal arts colleges. The increasing challenge is that it is difficult to articulate the ROI (return in investment) when you compare humanities to that of STEM fields, and it is hard to win university priorities when resources are limited. With the

development of DH, the humanities embraced broad computational and quantitative research methods which positioned humanities in an unprecedented way to be integrated with or enhance other disciplines including those in the STEM fields.

I think two tracks are to be followed in the future. First, the digital or computational trend will be integrated further with traditional humanities and humanistic social science research studies by applications of digital tools such as the GIS-enabled historical atlas/maps, digitised archival collections and ML applied Shakespeare studies, etc. It is hoped that young faculty members from all humanities fields will increasingly adopt computational tools and methods into their research studies. It is hoped that in the future, the “digital” methods will be so pervasive and become “native” methods in humanities studies that there is no need to single out DH from non-DH, just like a few people refer the computational tools/applications to sciences as digital science.

The second track is to enhance humanities’ influence in other fields beyond social sciences, particularly in the STEM fields. Humanities-centred scholars, who are widely thought to be indulged in self-admiration in the field exclusively, must strive to integrate the discipline with practical issues so that the discipline can play a greater role in impacting the development of human society. The discipline can be embedded in interdisciplinary research and global challenges confronted by all human beings. For instance, humanities can be integrated with climate change to achieve breakthroughs; the human-centric AI is a must-have future; humanities can enhance the sustainable society; it is hard to imagine that we can talk about social justice without considering humanities.

Following those two tracks, we can anticipate the “normalised” digital research methods into the humanities and with an emphasis on the second track in particular, humanities scholars are encouraged to think outside the box, to embrace them into the broad interdisciplinary challenges and to make a sustainable impact on the society.

L: I think the point is enlightening. In today’s industrial or digital society, technology and natural science have been widely worshiped, impairing the development of traditional humanities. Thanks to the rising of DH, it is hoped to apply digital technologies to reviving human science. However, digital technologies have been used substantially to verify issues discussed before. Consequently, digitisation may be hampered by humanities instead.

Currently, we have been cooperating with Peter K. Bol from Harvard University, who plans to hold a conference next year. The conference has been postponed several times. Peter K. Bol from Harvard University works jointly with memory institutions in China to promote DH. Alibaba has started a new project named *Handian Chongguang (Revival of Classic Chinese Texts)* to digitise and aggregate ancient Chinese books and convert scanned images into texts for open access. Chinese Academy of History has been established to co-build and share archives. I have also participated in the project and proposed the creation of a union catalogue via blockchains. Despite those investment and plans, I am doubtful whether the ambitious scholars can actually play a part.

W: One metric to judge a discipline’s status in the field or even the impact on the society is the investment from both governmental and private founding agencies. I believe it is crucial for DH researchers to apply for more mainstream funding. New trends have already emerged in the US. For instance, the National Institutes of Health and the National Service Scheme, two largest influential government funding agencies in the US, welcome interdisciplinary proposals and strongly encourage researchers from humanities and social sciences to participate in studies in fields such as AI, ML and climate change. Their grant offers add extraordinary and additional investment to expand humanities researches into the interdisciplinary field. On the other hand, the more exclusive agencies such as National Endowment for the Humanities will not only continue their mission to support humanities but also expand investment in interdisciplinary proposals which enhance humanities studies. It is vital to expand humanities into other fields while reserving humanities’ core strengths

simultaneously. The hot topics discussed across US universities and colleges are interdisciplinary ones focussing on global challenges such as poverty, climate change, water resource management and social justice. Today, I think any data-centred studies with a goal of creating impactful outcomes must shift focus to interdisciplinary research and global issues to make proposals and get mainstream funding support.

R: Today's discussion has covered seven out of the eight questions proposed. We have talked about DH trends in the past decade and the field's outlook in the global setting, the impact of emerging data science, data analytics, AI and other computational tools on DH, DH's slow advancement over the past five years and reasons, challenges faced by DH, how to apply for new funding resources to support DH development, the role of US-China collaborations on libraries and digital scholarship and DT of libraries. I agree that DH development was confined much to human science such as history and literature. Currently, interdisciplinary research has already been conducted by integrating DH with the STEM fields. It is a promising approach to enable DH to achieve further development.

As time is limited, we must end the workshop now. Thanks again to Dr. Liu and Dean Wang for their input today.

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