

# Digital Memory: A New Paradigm for Cultural Heritage

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**Abstract.** This article explores the backgrounds of the new paradigm of digital memory emerging in digital preservation and presentation of cultural heritage field. It highlights some of the conceptual work that frames the new paradigm. We believe this new paradigm can bring together the main theoretical areas under consideration for the future development of cultural heritage.

**Keywords:** Digital Memory, Cultural Heritage, Paradigm.

## 1 Introduction

The power of culture and heritage has long been undervalued before the late 20th century. In the UNESCO Convention Concerning the Protection of World Cultural and Natural Heritage (1972), cultural heritage refers exclusively to the monumental remains of cultures such as monuments, group buildings, and sites. Since considering human culture more and more as a whole, the concept has gradually come to include new categories of not only tangible forms but also intangible forms. Considering the value of oral and immaterial heritage, UNESCO Proclamation of Masterpieces of the Oral and Intangible Heritage of Humanity (2011) included 19 new oral and immaterial masterpieces and classified them as cultural goods. Since tangible heritage and intangible heritage are inextricably bounded up with each other, cultural heritage is the legacy showing the ways of living of certain communities from generation to generation, including customs, practices, places, objects, artistic expressions, and values (Committee, 1999). More and more culture heritage conversion projects are aimed to preserve both tangible and intangible traces from antiquity to the recent past.

In the past decades, the wind of cultural heritage conservation has developed a strong presence all over the world. Rare of these projects are called memory projects until UNESCO established the Memory of the World Program in 1992. Since then more and more people are trying to combine cultural heritage with human memory resulting in that memory projects have been among the new-rising fields both for heritage conservation and memory practice. Digital memory is a new trend of memory practice based on the quick developments of ICT. Since digital technologies change the whole way the world worked, now almost all kinds of memory practice are more or less digital-

based. By using digital technology to organize and present information resources, digital memory enables information resources related to different kinds of memory to be interpretable, associable, reorganizable, transmissible and shareable, and finally supports the construction and inheritance of collective memory in the digital age. We think the potential of digital memory can initiate a paradigm shift in the way to protect and present cultural heritage in the digital age. The implications of this transition to a new paradigm will increase opportunities for meeting the requirements of cultural heritage protection principles of integrity and/or authenticity, and promoting mass participation as well.

Research work being conducted by the authors is the Beijing Memory Project (BMP) in Humanities Beijing Research Center, Renmin University of China. BMP is trying to comprehensively use digital technologies (including digital collection, digital preservation, digital processing, digital presentation, digital dissemination, etc.) to transform various kinds of historical and cultural heritages of Beijing into digital formats so that they can be easily preserved, reorganized and shared. The main benefits of BMP include accumulating and inheriting gorgeous history and culture of Beijing, continuously displaying rich cultural deposits of Beijing, providing a sense of participation, emotion and identity support for citizens, as well as providing basic resources for academic research, literary and artistic creation, and other cultural activities. BMP brings together different lines of research in digital humanities, digital preservation and digital cultural heritage to evaluate the usefulness and benefits of this new paradigm.

To illustrate the conceptual basis of this shift, this paper explores the contexts for the new paradigm of digital memory emerging in digital preservation and presentation of cultural heritage field. Based on the BMP experience, it reviews some of the conceptual work which frames the new paradigm. We believe this new paradigm can bring together the main theoretical areas under consideration for the future development of cultural heritage.

## **2 Contexts for the Digital Memory**

### **2.1 Theoretical Background**

The field of cultural heritage conservation has gradually realized the importance of collective, social or cultural memory in recent years. Collective or cultural memory is about how groups remember their past or culture. The origin of memory study could be traced back to the Greeks, but the sociology field has not recognized social memory as a prominent area until the early twentieth (Olick & Robbins, *Social Memory Studies: from “Collective Memory” to the Historical Sociology of Mnemonic Practices*, 1998). The term collective memory was first proposed by Hugo von Hofmannsthal in 1902 and since then researchers from various fields, including psychology, history, literary criticism, and so forth, started to pay attention to the area. The concept of collective memory was introduced by Maurice Halbwachs in his landmark *Social Frameworks of Memory* (Schieder, 1978). Halbwachs (*Halbwachs, On Collective Memory* (Transl./ed), 1992) declared that people normally “gain, recall, recognize, and localize

their memories in society”. Olick (Olick, *Collective Memory: the Two Cultures*, 1999) summarized two concepts of collective memory “one refers to the aggregation of socially framed individual memories and one refers to collective phenomena sui generis” and proposed a strategy reconciling the individualist and collectivist approaches. According to the existing research about collective memory or social memory, We can summarize some basal theory points: 1) Collective memory has a capacity to be constantly constructed and reconstructed, shared, and passed on by large and small social groups; 2) Collective memory is built by the resources people share rather than the individuals’ minds (Irwin-Zarecka, 1994); 3) Collective memory is the concretion of identity. Therefore, the above discourses become the theoretical foundation of digital memory both at the levels of epistemology and methodology.

## **2.2 Practical Background**

The cultural heritage conservation practices are emerging and being undertaken around the world. Although with a relatively shorter history than traditional cultural heritage conservation, the practice of digital memory is booming in the past decade. Geographic scope, theme, and target group are typical phases of characteristics of the investigated digital memory projects. These projects can be grouped as international projects, national projects, and regional projects according to their geographic scope. The largest international digital memory program, the Memory of the World Program, is a strategy for the preservation of history. The World Memory Project with 193 member states presents more than 2400 worldwide projects on its website. Among the national memory programs, the American Memory, the Indian Memory Project, and the Singapore Memory are those with the most influence. Another phase of the projects’ characteristics is the theme of memory resources. A certain example is the September 11 Digital Archive containing more than 150,000 digital items, which memorizes, preserves, and presents the history of September 11 (Roy Rosenzweig Center for History and New Media and American Social History Project). The unique target group is another characteristic potentially making a project special and outstanding regarding the Psychiatric Survivor Archives of Toronto which concerns a quite special community. The diversity of the existing digital memory projects has laid solid foundations for the initiation of future projects.

## **2.3 Technical Background**

Digital technology has been widely applied to both tangible and intangible cultural heritage conservation. Digital memory, a new branch of cultural heritage conservation, also employed a variety of digital techniques, like digitization techniques, digital storage techniques, visualization techniques, and so on. Web crawling, three-dimensional (3D) scanning and modeling, panoramic picture printing, virtual reality shooting, and a plenty of the latest techniques have been utilized to collect and digitize the large volumes of memory resource (Fan & An, 2013), (Tan & Zhong, 2009); ontology theory and technology, semantic web technology, and the theory, methodology and technology of metadata strengthen the digital resource organization (Doulaverakis, Kompatsiaris,

& Strintzis, 2005), (Stasinopoulou, Bountouri, Kakali, Lourdi, & Gergatsoulis, 2007); Augmented reality technology, geographic information system technology, and animation technology enable the researchers to reproduce the memories vividly and provide immersive experience for visitors (Julier, et al., 2016), (Wilson, 2015). Furthermore, a series of applications, such as serious and edutainment games, have been developed for digital memory projects (Gesser-Edelsburg, 2012), (Rizvic & Prazina, 2015). The rapid development of digital technology during the past decades enhances the progress in digital memory theories and practices and heightens the efficiency and effectiveness of the collection, organization, storage, preservation, and presentation of memory resources.

### 3 Some of the Conceptual Work has been done

#### 3.1 About BMP

Since started in 2013, Beijing Memory Project (BMP) has developed its framework and achieved good results. Now we are confident that it can be taken as a real example of how to build up digital memory for city cultural heritage with the aim of innovative protection and inheritance. The framework can be summarized as “One Repository with Two Sites” (see Fig.1).

According to the figure, “One repository” refers to the largest repository for Beijing memory resources along with a retrieval system, and “two sites” refers to the special websites for presenting formal Beijing memory and an interactive website for collecting Beijing memory from the public. Two sites and the retrieval system are available to the public and they have been integrated into a unified public platform called “Beijing Memory Display Platform”, with the management system run internally by the project team.

**The largest repository for Beijing memory resources.** The repository was developed for processing and preserving accumulated Beijing memory resources in digital formats. All memory materials will be digitalized into digital information. Such digital information shows great significance as they will be preserved and maintained in the long term. With this in mind, BMP applied Open Archival Information System (OAIS), an international standard (ISO 14721:2010) proposed for understanding archival concepts associated with preserving electronic records and information in the long term. It employs a very general nomenclature made up of “terms that are not already overloaded with meaning so as to reduce conveying unintended meanings”. This is useful because BMP has its archival settings that all digital information related to Beijing memory is worth preserving, regardless of their forms, including but not limited to news, articles, books, pictures, videos, games, oral materials, 3D models, websites and so on. All information running into the repository needs to go through standard procedures for lifecycle management of capturing, processing, preserving, presenting and maintaining digital resources, eventually successful curation. The BMP repository is ambitious to build itself a national(or even international) digital collection of memory assets about Beijing. But its conduction needs thoughtful plans. The unqualified or illegal collection

is strictly prohibited. Memory resources are harvested mainly in three ways: 1) the original or first-hand memory materials collected from their copy-right owners or with their permission. The collecting work is usually conducted along with the process of subject projects; 2) the memory materials formulated in the process of subject projects as a result of re-interpretation, re-presentation or re-creation; 3) memory resources collected from the interactive site produced by the public. With the development of BMP repository, a retrieval system has been developed for better use and reuse of memory materials. All materials in the repository are available to both the public and researchers to meet their needs. More than thirty hundreds of original documents and ten thousands of metadata which have been added into the repository for proper curation and long-term preservation.

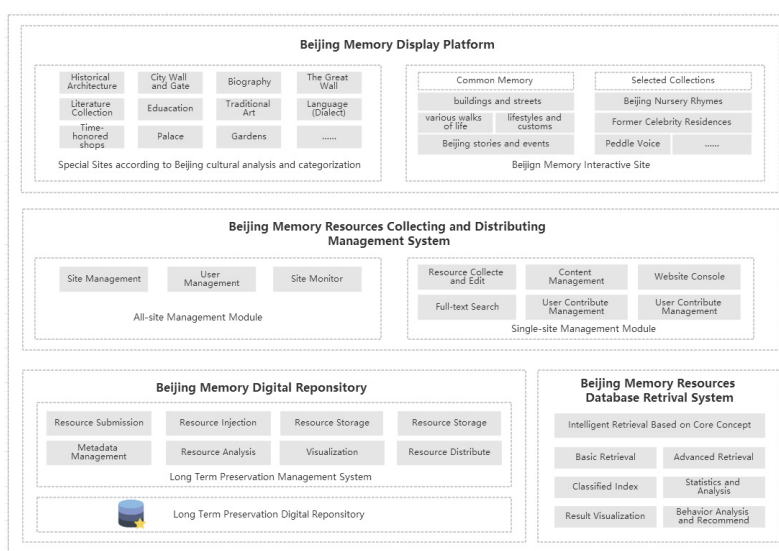


Fig. 1. The System Framework of BMP

**The special sites for formal Beijing memory.** Formal Beijing memory refers to Beijing memory requiring concentration for understanding or appreciation. In the age of fragmentation information, we need formal memory to resist the trend of superficial and fragmented information to improve our cultural identity. The special sites fully explore the existing memory materials aiming to present Beijing history and culture in a subject-based way. The subject projects are led by experts with great competences in their areas for in-depth analysis. Experts fully analyze official documentary contents and re-present them popularly and digitally, even re-interpret or re-create them with creativity. The outcomes usually include website products and paper publications. Since memory materials related to Beijing are so enormous, the primary task of the BMP is to determine which subject to choose. In the beginning, we tried to use ontology construction for Beijing cultural elements classification and have got 22 categories. Each of the categories has a ranking list of the most important subjects. However, we

could not always meet our expectations. We found that most subjects ranking high faced many problems such as lack of information and shortage of experts. So we adjusted the strategy to a range of subjects defined by ontology construction, that any subject prepared with adequate information, personnel and financial conditions will be given the priority to start. Every special website features three basic characteristics as follows: special subject, experts-led and high-level presentation for good user experience. The website building consists of four main steps: subject selection, information collection, resource interpretation, and multi-dimensional presentation. Every subject-website is a digital publication, and for better dissemination, every subject also gets a paper publication which consists of the Beijing Memory Series. Through these special sites, BMP can present the long history and deep culture of Beijing to the public with educational goals. The public can appreciate and express the essence of Beijing culture with confidence. 24 subjects have been officially launched with 7 presented online.

**The interactive site for crowdsourcing of Beijing memory.** The development of digital technologies makes it possible to engage citizens on a large scale in digital contribution. Personal narratives are emphasized, some will always be kept in people's minds until they are captured by BMP. The interactive site "My Peking Memory(MPM)" is a platform with public engagement in co-construction and sharing of Beijing memory, whose forms through crowdsourcing include crowd-funding, crowd-innovation, crowd-building, and crowd-sharing. The project hopes to build a culture-valuing memory with the belief of "every memory matters". All individuals, communities, groups or institutions from all walks of life are encouraged to contribute memories and contents about Beijing. By creating their permanent memory accounts, they can deposit their unforgettable memories and stories, usually in the form of photographs, texts and videos, and share them with others. They can also develop some memory subjects and calls for contribution or discussion through a convenient and accessible avenue. All materials collected by the interactive site will flow into the repository and go through the process of long-term preservation and utilization. The interactive site mainly aims to build a virtual community, allowing users to contribute memory and communicate their feelings. "My Peking Memory" has been presented online with two sections of Public Memory and Selected Memory. The former consists of four columns, buildings and streets, various walks of life, lifestyles and customs, as well as Beijing stories and events. The latter includes special collections, such as Peking nursery rhymes, former residences of celebrities. Till now, we have built 5 selected collections and more than 2000 memories have been added, with some good feedback from our contributors.

### **3.2 Framework Generated for Digital Memory**

According to the experience of BMP, we can extract a framework for the digital memory approach for cultural heritage. The digital memory approach involves memory-oriented and digital-based principles. Digital-based means digital tools, approaches, platforms, and applications have become ubiquitous within cultural heritage research and practice, and that's why we have the saying of digital cultural heritage. Since cultural heritage is an important part of human memory, the memory approach

then can become feasible in cultural heritage conservation. Memory-oriented means we should protect cultural heritage from a memory methodology, which means we should not only care about the cultural heritage memory, but also people's ideas, images, and feelings about it. It attempts to connect all three poles-memory, cultural heritage, and the group (society) - to each other.

The framework for the digital memory approach has three elements of memory resources, cultural interpretation, and social interaction (see Fig.2).

- **Memory resources.** Assmann distinguished the potential mode of cultural memory from the actual mode. Cultural memory can only shape a contemporary society's identity when it is in the actual mode. The memories "related to an actual and contemporary situation" can enter the actual mode (Assmann & Czaplicka, 1995). Since cultural heritage actual memory is maintained by objects in the world such as texts, rites, monuments, recitations, rituals, ceremonials, practice, observance, some of which we consider as kind of cultural heritage, we need to pay close attention to all those resources. This is the epistemological distinction between digital memory and digital cultural heritage. Digital cultural heritage considered about digitization, preservation and presentation of the cultural heritage itself, while digital memory considered about digitization, preservation and presentation of the cultural heritage memory. It means that the cultural heritage memory usually maintained by all kinds of objects rather than the cultural heritage itself. The scope of resource in the digital memory approach is much broader than the traditional approach. The output of the memory resources element is usually a database or repository related to the cultural heritage memory, just like the largest repository for Beijing memory resources in BMP.
- **Cultural interpretation.** Cultural heritage is a kind of human cultural memory reflecting the cultural unity and peculiarity of a group. The strongest motivation for us to care about the cultural heritage memory is the need for cultural identity and cultural self-confidence characterized by differences between the groups belonging or not, and between what appertains to oneself and what is foreign. We all know that cultural heritage is a kind of actual memory that keeps human memory last for a long time, but what it makes sense is that how we can use such actual memory to cultivate social identity or cultural identity. According to Halbwachs, no memory can preserve the past. What remains is only that "which society in each era can reconstruct within its contemporary frame of reference" (Halbwachs, *The Collective Memory*, 1980) (P261). Cultural interpretation is then become inevitable and important because it refers to how we interpret the cultural heritage and bring the memory to the public. Cultural interpretation usually happens on how many memory resources you provide for open access or how real the memory resources you provide. We highlight the cultural interpretation element here because we want to warn anyone who involved in using digital technologies to represent or recreate cultural heritage memory popularly and digitally with creativity should keep in mind to respect the principles of integrity and/or authenticity. The output of the social interaction element is usually related to the output of memory resources. But

when it related to represent or recreate, it does have an output like a VR, AR, 3D model or website. In BMP, we do have special sites for formal Beijing memory to resist the trend of superficial and fragmented information.

- **Social interaction.** Since memory-oriented principle requires us to not only care about the cultural heritage memory, but also people’s ideas, images, and feelings about it, the most important component of memory practice is how to promote public participation and support multiple perspectives. The Web 2.0 technology, which aims to enhance interactive sharing and participatory collaboration instead of simple content delivery, makes it possible. Different memory practices may have different social interaction mechanisms. Some of them may focus on the crowdsourcing or crowdfunding like Singapore Memory Project; Some of the others may focus on crowd innovation like the project of on the new of the Palace Museum in China, while some of the rest may focus on community network building. So social interaction may happen in different perspectives, but the main idea is the same that is to provide a platform for the public to engage in the construction of cultural heritage memory. We can get many benefits from social interaction which includes but not limited to culture heritage consciousness promoting, culture heritage learning and sharing, and community building. The output of the social interaction element is not fixed, and it could include a serious game or a social media account or an application platform for participatory just like “My Peking Memory(MPM)” in BMP.

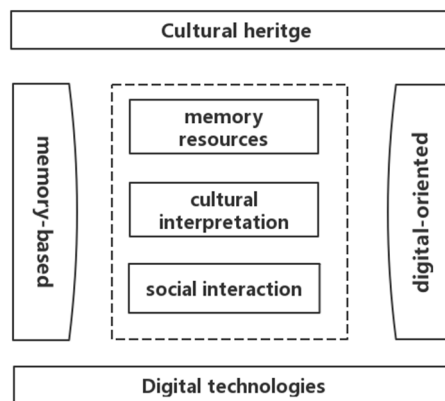


Fig. 2. Framework for digital memory approach

#### 4 Conclusions

The digital memory practice to date has expanded a picture for future cultural heritage conservation, which will involve memory-oriented and digital-based to construct the cultural heritage memory with public participation and multiple perspectives. In the Beijing Memory Project, we see the confluence of the three elements of **memory resources, cultural interpretation, and social interaction**. Digital technologies used in



dealing with the memory-oriented cultural heritage resources give the potential to change how we access and understand our cultural heritage. Social interaction highlights multiple perspectives by promoting public participatory to construct a total memory of cultural heritage.

The BMP has allowed us to experiment with the framework and three elements which can be considered as the bedrocks of a future successful system for cultural heritage. The digital memory approach can be carried out in an integrated system with all three elements involved, meanwhile, it can also be carried out separately resulted in different kinds of digital applications such as a database, serious games and so on. Moreover, many new capabilities will be provided in the future and we are just beginning to explore the real capabilities that will exist. It is necessary to conduct continued and sustained research to develop and assess the efficacy of the new paradigm.

Digital memory in this new paradigm for cultural heritage will continue to drive innovation across theory building, education, memory practice. It is important to involve all the stakeholders: communities, designers and developers, researchers and centrally the public in all stages of the design and implementation process. Digital memory is a new and emerging sector of cultural heritage conservation, but we believe it could solve many of the key problems and overcome the challenges in the cultural heritage field in the 21st Century.

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