Historical Asset Viewer for Efficient Management of Cultural Heritage

Chan-Woo Park, Hee-Kwon Kim, Jae-Ho Lee
Creative Content Research Division
Electronics and Telecommunications Research Institute
Daejeon, Korea
gamer@etri.re.kr, hkkim79@etri.re.kr, jhlee3@etri.re.kr

Abstract

This paper is about a plan to expand the conservation management and customized utilization service of cultural heritage. There are various platforms for storing and managing digital data at the National Museum of Korea. However, as many platforms began to provide services tailored to their respective purposes, there was no platform that covered all stages from the excavation of cultural assets to exhibitions. In addition, there is no viewer within the platform that can check files such as images or PDF documents attached to Heritage, and it is cumbersome to download and check each file. Therefore, for efficient management, fragmented cultural heritage knowledge resources are digitized and integrated, and information centered on artifacts is provided at a glance through a cultural heritage-based historical asset viewer.

Keywords: Cultural Heritage, Asset Viewer, Digital Heritage

1. Introduction

In museums, a consensus has been formed over the years that the fourth industrial revolution technology should be used in the field of cultural heritage. Numerous data are being 'digitized' on the subject of cultural heritage. However, until now, the primary purpose of digitized data has been 'archiving' [1].
Museums have independently created and managed cultural heritage data according to their needs, such as exhibition, preservation, education, and analysis. As a result, there is a problem of repeating the acquisition and processing of digital data for the same cultural heritage, such as preservation, education, and exhibition.

In the case of 2D data, re-acquisition is relatively easy, whereas in the case of 3D data, a lot of manpower, time, and money are invested because it goes through several stages of 'acquisition → processing → conversion'. There is no platform to share such hard-earned data, and if budgets overlap, national losses are inevitable.

Moreover, there is neither a system nor viewers to see the 'history of cultural heritage' at a glance. Cultural heritage contains many stories about where and how cultural properties were discovered, how they were stored in storage, and how they were displayed (permanent exhibitions, special exhibitions, overseas tours, etc.). In addition, it is recorded step by step whether or not it has been exhibited for research and preservation of the historical value of cultural properties.

Therefore, for efficient management, fragmented cultural heritage knowledge resources are digitized and integrated, and information centered on artifacts is provided at a glance through a cultural heritage-based historical asset viewer.

2. Overview of Historical Asset Viewer

In the case of the standard relics management system currently operated by museums, data are focused on the storage purpose of cultural assets. Cultural heritage name, nationality/date, excavation site, classification, data, author (if the same), scale, collection number, etc. There is another internal system, Digital Archive Management System (DAMS). In DAMS, data is uploaded in units of work rather than data upload centered on the artifact system, and this data is also accumulated without upload rules [2]. In addition, since it is a platform created for the purpose of data accumulation, there are many inconveniences in using it. When analyzing a specific cultural property, it is searched individually to find information related to restoration. In the case of famous cultural heritage, the accumulated data reaches several gigabytes. The reality is that users have no choice but to save it on an individual PC and then load it to check it.

To overcome these problems, it was necessary to develop a platform that allows users to easily search for, confirm, and efficiently manage information on cultural properties.

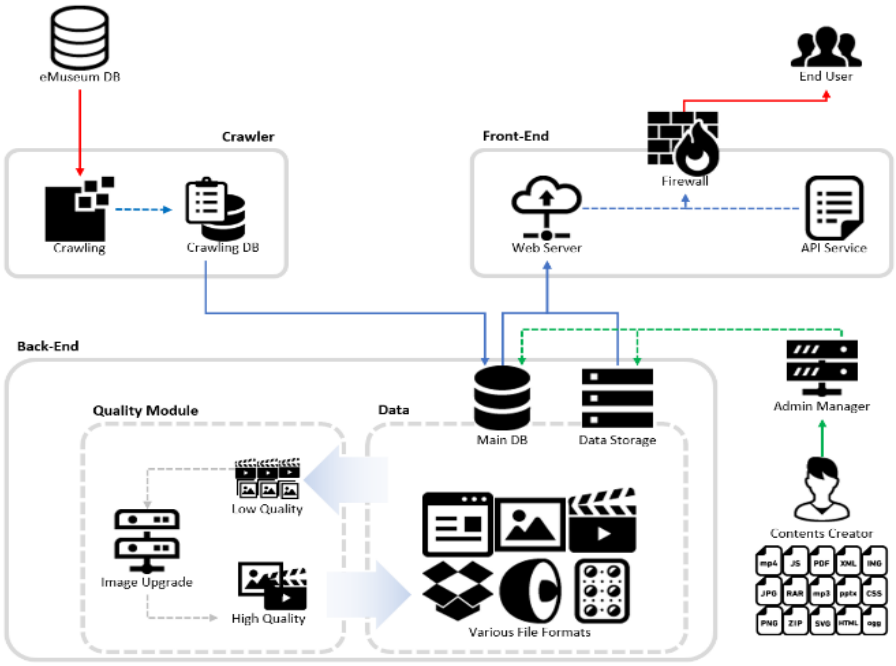

Figure 1. Conceptual diagram of developed System

Figure 1 is a conceptual diagram of the entire system for implementing a historical asset viewer based on cultural heritage. Information on the current status of cultural properties can be obtained from the E-Museum data [3] provided by the National Museum of Korea through its crawl server. In addition, it can be professional information that is not accessible to the general public, such as information at the time of excavation of cultural properties, preservation processing information, and management information, or 2D and 3D video data for content production.

Among the uploaded data, some kinds of photos and videos cannot be retaken, such as at the time of excavation, overseas cultural heritage, lost cultural property, and under restoration process. Some of these data have been changed to high-quality colorized data through resolution improvement, noise reduction, and image improvement modules [4,5].

The accumulated data is selectively provided to curators (professional information) or the general public (public information) who need related information through a web-based server.

3. Development of Asset Viewer

As information related to cultural heritage gradually increases, obtaining the information users want is emerging as an important issue. This is because systematic management from the early stage of data creation can serve as a framework for visualizing information on the relationship between cultural heritages in the future [6,7]. From this point of view, the developed system proceeded with a classification process for each purpose of data to provide various information related to cultural heritage.

If the order is listed from the viewpoint of cultural heritage data generation, 'excavation → restoration → analysis → preservation → storage → exhibition' is created as shown in Figure 2. All of this is digitized and stored in the asset viewer system.

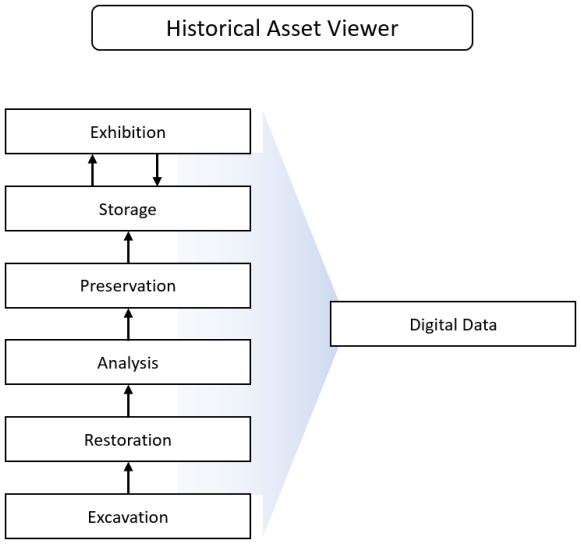

Figure 2. Flow Chart of Asset Viewer

The digital data stored in this way are listed in order according to each purpose of use, and the UI is composed as shown in Figure 3.

Overall, the buttons for each step are placed at the top and bottom of the left so that you can pass through the steps intuitively, the viewer is on the left, and cultural heritage information is displayed on the right.

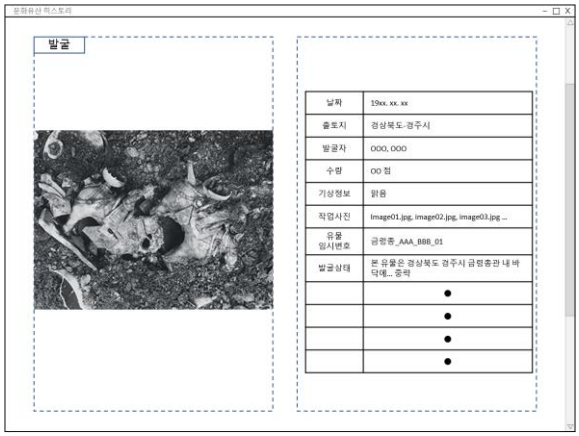

Figure 3. Excavation phase

In general, when an artifact is excavated, the importance of the artifact is not immediately known. An artifact number is determined according to the importance of the artifact, and a temporary artifact number is assigned at the time of excavation. Therefore, on the excavation page, the 'temporary artifact number' is displayed instead of the artifact number managed by the museum. In this screen, it is designed to express both the artifact number and the temporary artifact number for greater user convenience.

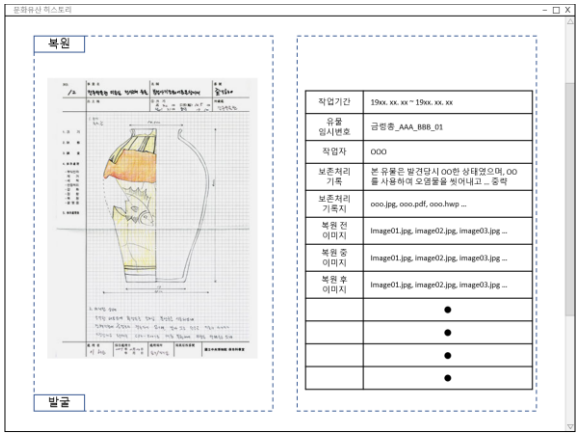

Figure 4. Restoration phase

The restoration page analyzes the condition of excavated artifacts. For example, in the case of earthenware, a brief record of how damaged artifacts were restored. In case of clothes, how contaminated clothes and paintings were restored was attached. It is attached as a file so that a detailed report could be prepared. In addition, images of each stage before/during/after restoration are saved so that other curators can refer to them when restoring artifacts in the future.

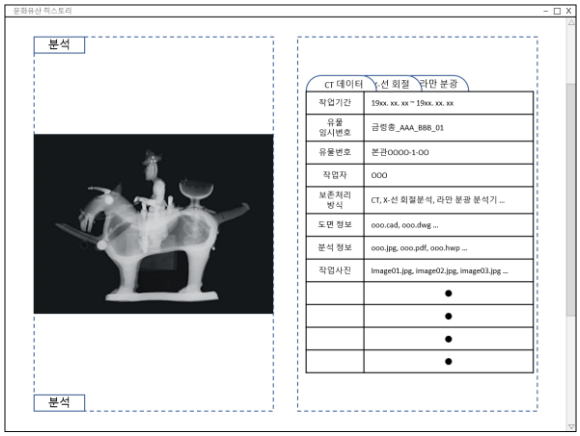

Figure 5. Analysis phase

Unlike the previous steps, on the analysis page, the state of the artifact is precisely analyzed and recorded using various equipment. In general, museums perform an analysis of the state of an artifact using appropriate equipment according to the type of artifact. Analysis information by equipment is organized in tabs at the top so you can check detailed information. And you can download gigabytes of data, such as CT data, and view it on your local PC. In the case of 3D data saved as a gtlf file, you can check it directly in the browser.

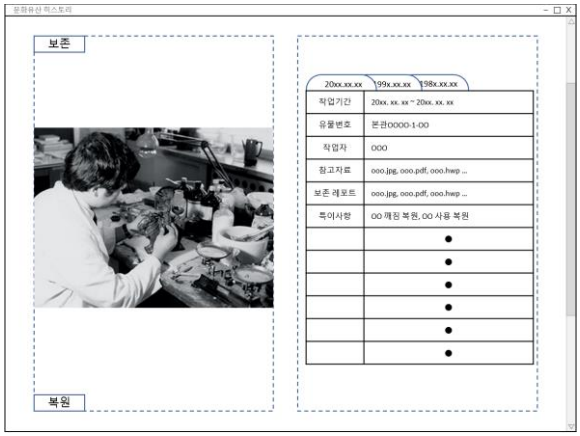

Figure 6. Preservation phase

On the preservation page, the top tabs are organized by retention data. Each tab is utilized when a new preservation technique is announced or when a national or international exhibition needs to be re-conserved before being archived. In the case of conservative treatment using drugs, evidence (previous conservative treatment records, etc.) on what basis the drug was used can be uploaded and viewed.

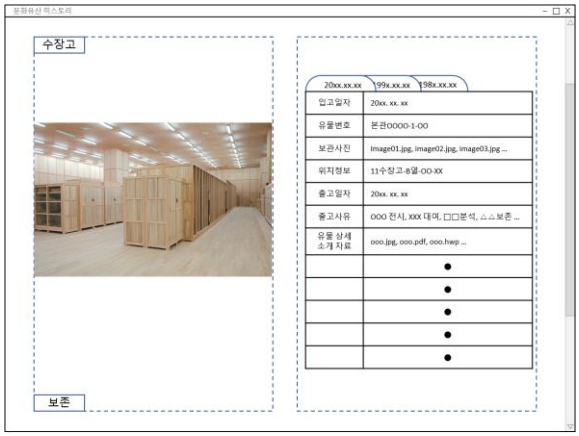

Figure 7. Storage phase

On the storage page, if import/export operations occur for the purpose of exhibition, academic analysis, rental to other institutions, etc., the upper tab is organized by date so that related records can be viewed. In addition, location information and photo information of the current storage is stored together, so the current status of cultural assets can be checked. On the cultural heritage detailed information page, you can check all information related to cultural heritage, such as the academic value of the artifact, exhibition catalog materials introducing the artifact, and artifact introduction data at the time of the exhibition.

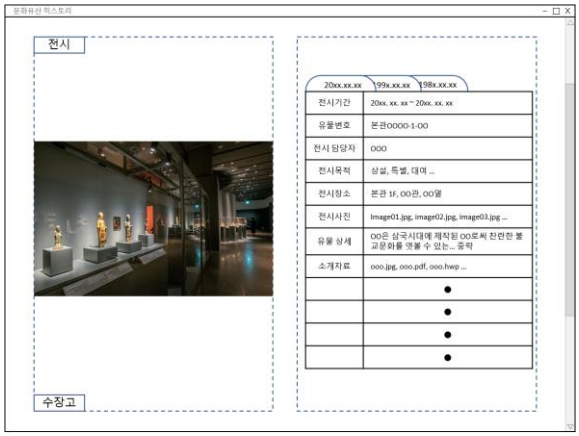

Figure 8. Exhibition phase

The exhibition phase includes information related to the exhibition as well as the cultural heritage displayed. It consists of tabs that can be categorized by various exhibition environments, such as permanent exhibitions, special exhibitions, and exhibitions through domestic and international rentals. In addition, upload files such as images and videos containing the exhibition situation so that you can check them directly in the relevant tab. In the case of an online exhibition, you can check the asset file (2D/3D) used online.

4. Conclusions

Since the National Museum of Korea performs various tasks in various departments, it utilizes various platforms for each purpose. For one cultural heritage, various analog and digital data are mixed in each department and stored in various forms in work systems and personal PCs, but the reality is that information sharing between departments is not smooth. Likewise, analog data may be piled up around the seat of the person in charge, and the history of related data may not be known properly due to reasons such as the person in charge leaving or leaving the company.

To overcome these problems, we developed an efficient cultural heritage management system and viewer. Using the developed system, data for each stage of 'excavation → restoration → analysis → preservation → storage → exhibition' is reconstructed. And among the data included in each step, the efficiency within the platform can be increased by adding a module that can directly check files such as images, videos, documents, and 3D data of user work. Based on the developed system, museum curators can systematically manage the museum step by step instead of step by step [8].

Acknowledgement

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