Information Design for Visualizing History Museum Artifacts[*]

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In the past few years, museum visualization systems have become a hot topic that attracts many researchers' interests. Several systems provide Web services for browsing museum collections through the Web. In this paper, we proposed an intelligent museum system for history museum artifacts, and described a study in which we enable access to China and Japan cultural heritage information from two history museums, the National Palace Museum in Taiwan and the Tokugawa Art Museum in Japan. Results from these museums' databases were used to develop a prototype system to demonstrate advanced cultural learning and historical timeline functionalities for foreigners. This system is based on temporal data from the museums' databases and provides the user with powerful data manipulation and graphical visualization tools. It might become a basis of an interactive digital museum system for Chinese and Japanese heritages, especially for foreign users.

Keywords: museum, heritage, timeline, exhibits support system, user interface

Introduction

Traditionally, curators are required to classify and interpret elements of distinct artifacts, proving them for visitors examining and appreciating the works. This has become the normal. In most historical exhibits, curators desire to convey the message for the research background and the matter of collections. The museum curator increases the introduction of materials in order to support the museum exhibits and the gallery staff guidance, as possible as they can satisfy the growing needs form the visitor for high-quality of the exhibit introduction. When visitors appreciate the artifact at first, certainly they acquire the abundant information from exhibits. Mostly, museum learning uses the concept of grouping the substance of exhibited objects especially for history museums. Similarly to digital library access, many institutions provide users with both text searching of collection content and categories, such as object type or subject matter, it is really useful in organizing items for the museum. However, these broad institutions may not always allow the individual to find other museum's collections quickly and easily. There are no systems to integrate other museum collections by different areas, nor even by different countries. The difficulties of changing such a system will make it increasingly possible to search and browse for different museum items, using richer sets of heritage classifications which based on the collections database. Nonetheless, we attempted to assist the visitor's

understanding of the whole exhibition, this system changes the traditional orientation towards the curator's interpretation and suggests the exhibition introduction in advance especially for first-time visitors.

We targeted these visitors who are difficult to interpret their own history knowledge without any support from the curator or professional instructors, especially for foreign visitors. We aim to propose a strategy which mainly increases the understanding of China's and Japan's histories by this self-reliant exhibit learning system. This study used two museums (National Palace Museum in Taiwan and Tokugawa Art Museum in Japan) data as our samples to express how museum Web systems could be applied to enhance access to a large online heritage collection from different museums, with regard to browsing and exploring the heritage materials related to the history timeline.

Museums Timeline Applications

Many applications for information visualization have been developed, and some researchers have already applied subjective measurements to accompany objective results. There are many familiar examples of timelines. Figure 1 shows a particularly elaborate timeline, The Wall Chart of World History. They display the reigns of rulers of the major countries of the world along with commentaries about those reigns and important historical events. Visually, the timeline makes extensive use of color, shape and scale, and a few other familiar paper timelines show cultural and scientific advances. Event relations are particularly important. Viewing event relations among the news with timelines has some similarities to viewing postulated relationships between propositions in hypertext argumentation systems. On the other hand, for visualization systems, some researchers use the points of keywords, time and 3D (three-dimensional) space to display visualization interfaces. For example, Nomata and Hoshino (2007) proposed a novel visualization system for news articles that supports the exploration, the observation and the supplying of visual summaries of news articles. Matsumoto, Sumiya, and, Uehara (2005) proposed a multi-channel dissemination system with a time dependent filter and an application technique for time-series documents on the Internet. He also took a push-based application method based on confidence and scoop levels to describe a prototype system.
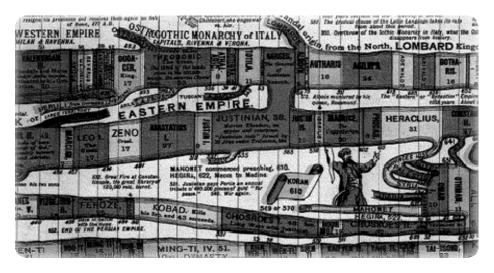

Figure 1. The Wall Chart of World History, the users' views that event relations among the news with timelines have some similarities to viewing postulated relationships between propositions in hypertext argumentation interfaces.
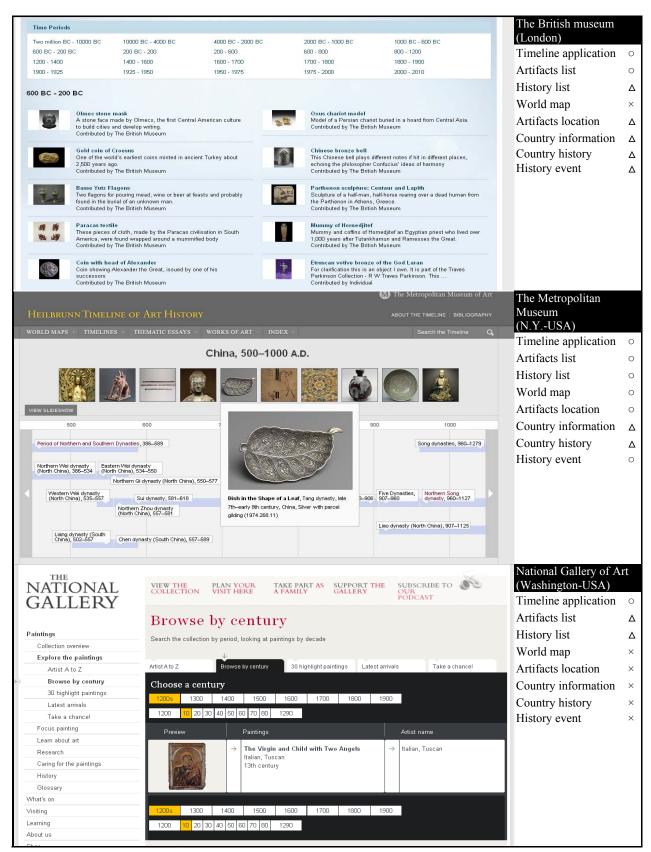
Figure 2. The museum timeline applications.

We surveyed several timeline applications of all kinds of museums all over the world (see Figure 2). It is a popular way for museums to express their heritage collections by time or history classification. It was conducted to get an idea of why people use the museum timeline site and use this input to help guide the design of a system for browsing and exploring material related to the heritage history or culture. With regards to interface design matters, researchers (Fluit, Sabou, & Van Harmelen, 2005) mentioned both typical and more experimental visualization techniques ranging from ranked lists, clustered result displays, tag clouds, cluster maps and data-specific designs, such as timelines. Traditional timeline systems are also incorporated into the different museums' advanced data relations. However, most users are usually required to directly select a specific year or range of times. Enhanced presentation of event-based information could include an interactive timeline, what is also of interest would be the ability to explore relationships among each heritage background. Moreover, most objects have been handed down accompanied by meticulous family documents, catalogues and other records. However, in these museums, despite of the situation that only one museum data of providing access to cultural heritage materials, the applications of browsing Websites described here have primarily been adopted on experimental sites or for small amounts of collection data, rather than being deployed by large cultural heritage organizations.

History Museum Timeline System

We wanted to show the different history museums heritage data, Tokugawa Art Museum and the National Palace Museum, by an interactive application for foreigners. The user can easily understand and collect information through this system which is based on temporal data from museum database and provides the user with powerful data manipulation and graphical visualization tools. It might become a basis of an interactive digital museum system for China and Japan heritages, especially for foreign users. Before constructing the museum timeline system, we classified and analyzed the museum collection data of the "National Palace Museum" (Website, http://www.npm.gov.tw/index.html) and the "Tokugawa Art Museum" (Website, http://www.tokugawa-art-museum.jp/index.html) and used the collected contents of each museum object as basic data. Museum timeline system is mainly constructed by the user interface and the collection database. The first step of system construction is to capture heritage data from Websites, set various countries representative history museum as our objects and capture the information from museum Websites. The results displayed in all the views are constrained by the values selected in both history events and heritage facets. A useful interface could show links in response to show the useful information for the user's queries and explain it. In this system, the user is able to scroll the timeline horizontally to show different time periods. The prototype allows users to explore the collection using one of three concepts:

(1) Concept of history timeline: providing history event and heritage collections;

(2) Concept of the world map: providing information on museums and the titles of their artworks;

(3) Concept of the culture and background: providing more information on the artwork and featuring history events.

The collected information can be compared in this application in Figure 3. The expression is easier to understand by the timeline menu and we show the age and collection by historical chronology and present the historical events and collection background directly.
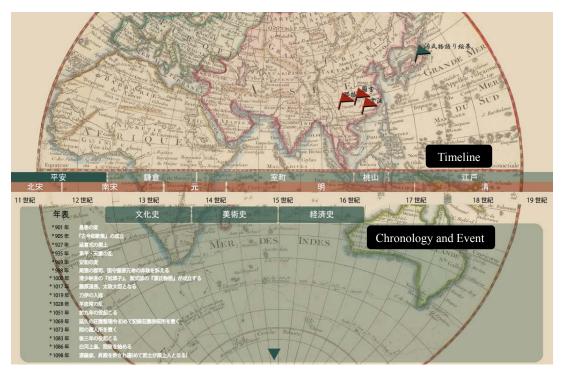
Figure 3. The concept of system application: Timeline.

Timelines can be an effective aid for understanding relationships among events. Interactive timeline interfaces of the museum could enhance traditional collection information, and it is an effective aid for understanding relationships among events. For instance, relevant information could be displayed to a user and the user could browse for additional information as needed. Prototype interfaces are described allowing users to scroll the time bar and select from multiple timelines to display attributes of every event. Chronology can provide the integration across many different parts of history. The user could be oriented to a specific time period with a dynasty of timelines. Temporal information can also be presented in tabular form, for some purposes that may be a satisfactory representation. Tabular presentations may be characterized as showing ordinal representations while graphical timelines generally provide interval representations. We wanted to help users from different cultures and made it possible to understand cultural relics and museum information. Moreover, we aimed to build a useful education system according to their needs and knowledge. This system integrates the cultural relic's data of two museums and builds a new format. It develops a new cultural relics system which uses history museums data as a radical. On the other hand, using the existing digital resource of NPM (National Palace Museum) and TAM (Tokugawa Art Museum) effectively and making the user range more popular, it will enable even the foreign learner to use it. Because a spatial extent is useful to select for the organization of information on digital media, a wide variety of geographic information system interfaces are currently being developed. This study attempted to explore the feasibility of history museums in the context of a larger online heritage collection, with an emphasis on different country background of task and user. The interface applies the history period between China and Japan by the horizontal layer, and this style is especially suitable for displaying bounded artifacts, such as the history or the museum collections. It is also convenient for displaying multiple bounded attributes. When clicking on objects in the interface can have a variety of artifact information. Clicking on times on the timeline gives more information about other museum works during that

century. Given a sophisticated representation of a history period, it might be possible to apply complex reasoning to the relationships collected in the database of historical facts. However, reasoning from large collections of complex information in knowledge representation systems has been needed in a museum artifact system. The interface shows timelines being split and merged and it also shows the explanation of heritages which give a visual representation of major history events. Illustrated timelines of the heritage history could be developed in which the influences on any work selected by the user would be illustrated with extensive graphics or pictures. If an expert on China and Japan history might want far more detail displayed about a topic than the ordinary user, precisely predicting which information will be relevant for a user is difficult. But the most complex issues in the design of interactive interfaces have been the layout of the museum objects. Therefore, the system makes it possible to access other links in different languages, such as English, Japanese or Chinese via the collection introduction which is deemed to be useful, in order to further the users' information seeking and exploring process. Upon investigation, the most notable difference being the percentage of people who would find it useful to explore relationships.

Conclusions and Future Work

The museum is regarded as the demand for varied requirements from our society, and it plays a role treated as endeavor to provide learning opportunities and taking them into many account of the diversity for people's demands. Learning in museums is considered to be that visitors construct their original knowledge or experiences through museum objects as learning resources. However, it is said that they need museum literacy to interpret them, and such literacy is not an innate but acquired ability from their previous knowledge and experiences. Unfamiliar visitors tend to fail museum learning because of their lacks of museum literacy. Therefore, museum should compensate their shortage to develop their learning. This paper described a study in which we enable access to China and Japan cultural heritage information from two history museums, the National Palace Museum in Taiwan and the Tokugawa Art Museum in Japan. Results from these museum databases were used to develop a prototype system to demonstrate advanced cultural learning and historical timeline functionalities for foreigners. This system is based on temporal data from museum database and provides the user with powerful data manipulation. For instance, interactive timeline interfaces could be described which allow a viewer to scroll, change the area, select from multiple timelines and display attributes of history events. We want to help users from different cultures understand the cultural relics and museum information, moreover, building a useful education system according their needs.

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