Chapter 42
Digital Museums in 3D Virtual Environment

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ABSTRACT

This chapter aims to present an overview of the field of digital museums and describes the current framework of content management systems feasibly integrated in the museums in 3D virtual environment for assisting visitors to deal with information overload and providing personalized recommendations, content, and services to them. Digital museums in 3D virtual environment are an intriguing alternative to let visitors experience them compared to thousands of existing digital museums that are similar to digital archiving places published in the Internet. Exemplary characteristics of digital museums in Web 1.0, Web 2.0, and Second Life are also reviewed and discussed. Moreover, prior classification of visiting styles essential to personalize the museum context and content is described in this chapter.

INTRODUCTION

Nowadays, a hundred of emerging Web-based museums has been proposed to improve preservation of and access to cultural heritage. Their examples are Australian National Maritime Museum in Sydney that aims at dynamic and innovative managing and exploring Australia's maritime heritage via http://www.anmm.gov.au/, Art gallery of Ontario that publishes the museum content on-line via http://www.ago.net/ to help new citizens learn more about their new home country through art. Another example worth mentioning is Smithsonian Institution that is the world's largest museum complex and research organization composed of 19 museums, 9 research centers, and the National Zoo. All museums under Smithsonian Institution found in http://www.si.edu/museums/ have developed their digital museums where visitors of National Portrait Gallery can search more than 80,000 portrait records from the Catalog of American Portraits and new material is added regularly, and automatically published to the Website after being cataloged and validated.

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Similar to other virtual organizations, the museum organizations can exploit the following on-line characteristics:

1. Operation with reliability and availability
2. Availability for anyone who can access through the Internet
3. Convenience for users who are willing to be collaborative
4. Reduction of cost for housing and exhibiting artefacts

Since Museums without Walls, one of distant learning projects under the incorporation of academic institutions was launched, the museum context has become significant teaching tool, and the museum itself has become a learning institute. The mission of museums has been changing its major priority from care of collections to management of Web-published content. Consequently, Content Management Systems (CMS) integrated both concepts of user-generated content and social media bursting with Web 2.0 is a key of achievement. The CMS can also engage with the personalization issue to enable the museum context more suitable to individual visitors ranging from school users to senior people with varying preferences and knowledge backgrounds.

For example, Bazley and Leftwich (2009) examined the use of on-line museum resource in schools with a case study from the Museum of London. They proposed the pedagogical integrated CMS through school-users that supports teachers using digital assets and interactive in planning and instruction. Interestingly, some technical difficulties in the inaccessible material via the Internet due to technology and security constraints, or simply lack of awareness were transformed as the supply chain problem. Therefore, some countries such as Australia and Canada funded the agencies working with museum organizations to facilitate the flow of content into classroom environments as addressed by Peacock and Timpson (2009).

With advanced computer graphics and Internet technologies, the 3D virtual environments for digital museums have been found in diverse platforms such as Second Life (SL) (Rothfarb & Doherty, 2007; & Urban, Marty & Twidale, 2007; Carrillo, 2007), 3D interactive virtual galleries in the Web site (Murg, Moritsch, Pensold & Derler, 2008; Amakawa, 2008; Cooper, 2006), 3D virtual reality (Caviedes, et al, 2008; Wilson & Weisbart, 2008), and game engines such as "Zoo" (Schaller, 2009). The 3D virtual environments fulfill the visitors' needs by enhancing the curatorial and architectural design process, reducing exhibition planning costs and processes, improving the visualization of exhibits, and enabling cross-departmental collaboration. With the rich multimedia spaces such as SL, learning capabilities and social networks for visitors in digital museums are enhanced. Hence, SL will be explored and discussed in the rest of this chapter, after the background section.

BACKGROUND

This section begins with an introductory survey of CMS within a scope of Web 1.0 that can achieve the core mission of museums for collection record management including acquiring, removing, and caring of collections. It has been integrated to services emerging in Web 2.0 to complete the essential mission of museums by changing the way museums act and how they communicate with their visitors. Several researchers have proposed the way museums can provide visitors' opportunities for the appreciation, enjoyment, and understanding of the collections and other museum holdings. Due to the rapid growth rate of users in 3D virtual environments, SL is a recently attractive platform where hundreds of digital museums belonging to both individual and organizations have been implemented.

Prior to the CMS, let us explain an infrastructure of digital museums consisting of three major