

Using Digital Storytelling in a Virtual 3D-Museum for Beijing Old Objects

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Abstract. This paper presents an overview of the construction of a virtual online 3D-museum for Beijing old objects (3D-BOOM) through digital storytelling. The project of 3D-BOOM proposed, implemented and evaluated an innovative conceptual and technological framework applying digital storytelling in 3D-museums, which will enable both the experiencing of personalized interactive stories for the visitors of cultural heritage and the authoring of narrative structures by the cultural experts. The emotive virtual cultural experience provided by 3D-BOOM will make cultural heritage more attractive and effective.

Keywords: Virtual Museum, Beijing Old Objects, Storytelling, 3D Technology.

1 Introduction

Beijing old objects are widely recognized as a typical cultural symbol of the old Beijing lifestyle. Different from the highly valued antiques whose quantity is relatively small, the old objects are less valued but more common and played an important role in the general public's daily life because of their functionalities during certain periods. For instance, all the daily appliances used in the old Beijing could be regarded as the Beijing old objects, such as the old furniture, the old kitchen utensils, and so forth. Figure 1 is the drawing of two Beijing old objects, the arm and Sliding Weight of a Steelyard.

The designs and functions of the objects in a certain period can reflect the general public's preferences, the fashion, the development of science and technology, and furthermore, the culture of the time. Piecing all the old objects together will reconstruct and illustrate the civilian life in the certain old periods and also build functional and emotional connections between the users and those objects, which enables the objects to initiate the general public's vivid memory of the old days. During the past decades, a number of museums collecting the Beijing old objects emerged, including the Beijing Old Objects Museum and the Shunyi Folk Custom Museum. However, according to the project members' preliminary investigation, few online museums for the Beijing old objects have been constructed so that the collections of the Beijing old objects can only be accessed by a limited group of visitors.



Fig. 1. Arm and Sliding Weight of a Steelyard



Fig. 2. Old Beijing Kitchen

This project, named 3-Dimensional-Museum for Beijing old objects (3D-BOOM), aims to expand a whole picture of the old Beijing lifestyle to the visitors by exhibiting various Beijing old objects in specific virtual living scenes online. Figure 2 displays the drawing of a living scene of the old Beijing, which is the kitchen in a Beijing Quadrangle Courtyard. A website has been developed for the 3D-BOOM and will be open to the public for free. This virtual online museum shares the same goal with the physical museums. A widely recognized goal of museum is communication. Museum communication is the articulation of understanding and experimentation of relevance building (Nielsen, 2014). To achieve the communicative goal, this project visualized several living scenes to display the selected objects with 3D technology and applied storytelling to “provide interpretations through combinations of meaningfully arranged mediators” (Hooper-Greenhill, 1999).

2 Design and Implementation of the 3D-BOOM

The entire procedure of the construction of the 3D-BOOM had two primary stages, design and implementation. The design stage can be divided into two steps: the design of the virtual space and objects, and the story design.

2.1 Design of the Virtual Space and Objects

As mentioned before, the Beijing old objects were connected to the civilian from both functional and emotional perspectives. Because of the functionalities of the objects, they were usually used in specific scenes and scenarios. To reproduce the relevant scenes and scenarios as well as the objects can wake up the visitors’ memories of their

daily life in the past, and also shorten the distance between the visitors and the virtual museum by placing the objects in a well-arranged spatial order. Accordingly, the team members determined to display the objects in certain living scenes and scenarios in the 3D-BOOM. The virtual space design stage has three steps:

- Step 1: Designing the virtual environment of the 3D-BOOM
- Step 2: Selecting the old Beijing living scenes which will be visualized in the virtual environment
- Step 3: Selecting the Beijing old objects and placing them in the selected scenes

A Beijing quadrangle courtyard was selected as the virtual environment in the first step. The Beijing quadrangle housing is unique for its signature form, with a basic square or rectangle shape and an open court in the center (Chan & Xiong, 2007). It plays a significant role in the culture of Beijing, sharing similar cultural connotation with Beijing old objects. By setting Beijing quadrangle courtyard as the whole 3D-BOOM's environment, five living scenes for the old objects were selected, including Hutong outside the Beijing courtyard house, the court inside, the living room, a dresser, and a kitchen. All these scenes can help piece relevant Beijing old objects together and further constitute a living picture of Beijing quadrangle courtyard and old Beijing. For each of the selected scenes, more than one relevant Beijing old objects were selected by the project team members and were visualized and placed in the scene in a designed order.

2.2 Story Design

Storytelling is the method which helps gain the listeners' attentions and generate personal connections between the visitors and the content, as well as make the content more comprehensive for the public (Bedford, 2010), (Smith). By applying value-creation framework to analysis, (Hanley, Baker, & Pavlidis, 2016) further vindicated the efficiency of digital storytelling programme. In the programme, the visitors told digital stories and the knowledge imparters evaluated the stories. The study elaborates that digital storytelling, vividly displaying knowledge both acquired and to be imparted, supports and promotes the two-way communication between the visitors and the knowledge imparters. To strengthen the communication function of the 3D-BOOM, this project applied storytelling to the virtual environment so as to establish emotional connections and help pass on the memory of the old objects. The stories were designed in two mechanisms:

- Mechanism 1: expert-generated stories
- Mechanism 2: visitor-generated stories collected via the interactive mechanism

Because the story of the old objects is closely linked with people's memory, the experts of this project picked up interesting and resonant stories to evoke the visitors' emotion. Generally, the stories obtained involve the invention, history, functions, cultural connotation, and other aspects of the Beijing old objects, as well as relevant anecdotes with famous people.

By reproducing the old times, the museum may inspire the visitors to share their own stories via the interactive mechanism of the 3D-BOOM website, and enrich the information resources of the museum at the same time. In this way, while preserving the tangible cultural heritage, the more precious intangible cultural heritage, the collective

memory of old Beijing, was harvested. The collective storytelling aims at inspiring social creativity to reconstruct the old Beijing lifestyle, “integrating both the tangible and intangible resources” of Beijing community (Giaccardi, 2006). Some featured stories will be posted on the website. The contributors will receive digital certificates rewarding their contributions to the virtual online museum.

2.3 Implementation of the 3D-BOOM

It is evident that digital technology is transforming museums into hybrid and complex spaces, where the virtual lives of characters and stories are blended with the physical form of artefacts (Irace, as cited in (Dal Falco & Vassos, 2017)). The 3D technology is crucial for the virtual museum of antiquities constructed on the Internet as it means more vivid simulation of the objects and also helps with the contextualization of the exhibition. So the 3D-BOOM allows the visitors to wander in the virtual environment and scenes and glance at the objects laid out in the setting. When clicking on an object, the 3D model of it will pop up to occupy the whole screen and show its basic information and story. The major steps of implementation of the 3D-BOOM are:

- Building a website with Beijing quadrangle courtyard as the virtual environment
- Scanning the Beijing old objects and obtaining the data
- Modeling the Beijing old objects and visualizing them in the virtual scenes

3 Future Work

The project team has already visited a number of the Beijing old object collectors and obtained a series of stories from them. The team members went to the Shunyi Folk Custom Museum more than three times to scan the typical Beijing old objects and scenes. One scene, the kitchen of the five identified living scenes, and the objects in it are being constructed. The team will go on to scan more objects and scenes, to model them virtually, and to collect and organize more stories in the next steps.

4 Conclusions

The storytelling method and the 3D technology have been proved to be very useful for the construction of a virtual online museum. This project employed both methods to creating the virtual museum for the Beijing old objects. The construction of the 3D-BOOM will not only provide free online access for the public to rich resources of the old Beijing culture, evoke the public’s memories of old Beijing, but also benefit the protection of the culture heritage and the memories of old Beijing.

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