Virtual Yamahoko Parade in Virtual Environment

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Abstract

The authors of this paper focus on Yamahoko parade in the Kyoto Gion Festival, which was inscribed on the UNESCO’s Representative List of the Intangible Cultural Heritage of Humanity in 2009. We produce a content, combining motion and acoustics of Yamahoko floats, parade spectators and crews within a platform of Virtual Kyoto. Approximately 730 spectators are simulated in this virtual parade to make crowd behavior realistic. In January 2010, the Museum of Kyoto had an exhibition of Virtual Yamahoko Parade which received favorable comments from visitors.

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Keywords: Virtual Cultural Heritage, Digital Museum, Gion Festival, Yamahoko Parade

1 Introduction

Recently, extensive research has been conducted on digital archiving of cultural properties in the field of cultural heritage. A focal point of the research is the processes of recording and preserving both tangible and intangible materials by using digital technologies.

For decades, digital recording has been employed for tangible, material cultural heritage including archeological sites, and historical buildings and monuments. Compared to that, however, intangible cultural heritage such as performing arts, theatre, social practices, and events, has rarely been regenerated in the virtual world. One of the typical researches on restoring tangible and intangible cultural asset is a CG restoration of a historical Noh stage and CG animation of Noh play performed on it [Furukawa et al. 2006]. The play has been performed by a famous Noh player, whose body motion had been captured with a motion capture system. This content was modeled and rendered by using 3D CG tool, Lightwave, and it is a non-real-time CG content that only allows users to watch a video generated from the CG animation.

Our research specifically focuses on assets of Yamahoko parade in the Kyoto Gion Festival, which was added to the UNESCO’s Representative List of the Intangible Cultural Heritage of Humanity in 2009. Every year on July 17, the festival culminates in a parade of yamahoko, floats known as ‘moving museums’ because of their elaborate decorations with centuries-old tapestries, and wooden and metal ornaments. The festival is held by the Yasaka Shrine whose parishioners parade thirty-two floats to represents each self-governing parish. Approximately 150 thousands spectators gather to see the parade every year.

To reproduce Yamahoko parade in virtual environment, we generate a content that combines motion and acoustics of the floats, parade spectators and crews called hikikata, ondotori, and kuru-makata within a virtual world platform of Virtual Kyoto. At this stage of our research, the virtual world contains only four, better-known floats out of the thirty-two, and a much fewer spectators than at the time of real parade.

2 Producing Virtual Yamahoko Parade

Virtual Yamahoko Parade contains CG floats, crowd simulation, acoustics, crews and Shijo Street of Virtual Kyoto.

2.1 CG Floats of Yamahoko Parade

Four CG floats of Naginata-hoko, Kanko-hoko, Fune-hoko, and Kitakannon-yama were included in this virtual parade. Four models of Yamahoko have been created by laser-scanning detailed miniatures of the real floats as the miniatures were made available and taking digital photos of the floats during the festival, as well as surveying the floats’ drawings, made by the Kyoto City Tourism Bureau.

2.2 Virtual Kyoto

Based on MAP CUBE data, 3D models of Virtual Kyoto are made by extruding footprints of building, obtained by air-borne laser-
2.3 Crowd Simulation of Spectators

Crowd simulation of spectators constitutes an important element for regenerating the parade as the simulation indicates how they are supposed to behave at the time of the event in the Japanese cultural context. To create spectator models, we modified models of man, woman, child and elderly, provided by Vizard. Each spectator model can illustrate reactions to the Parade by basic motions of talking, listening, shouting and clapping hands. These models are arranged on both sides of Shijo Street in Virtual Kyoto.

2.4 Acoustics of the Parade

During the time of real parade, we captured its music played by the traditional instruments of drum, flute and bell with multi-point measurement technique. Besides that, we also paid special attention to record ambient noise and noise made inside of the floats during the Parade.

2.5 Models of Parade Crews

The Virtual Parade includes three kinds of parade crews: hikikata who pull the float; ondotori who lead the parade with a Japanese fan; and kurumakata who control the float’s directions. Character animation of these crews, therefore, is crucial for regenerating realistic movements of the parade. As the crews have their distinctive costumes and ways to move respectively, in order to make their models realistic, we obtained their motion data. Figure 2 shows the character models of hikikata, ondotori, and kurumakata which we produced with 3ds MAX.

2.6 Embodiment of Virtual Yamahoko Parade

Vizard software enables us to create Virtual Yamahoko Parade in real time by integrating its assets. VRML data of Shijo Street, as well as the four floats are imported into Vizard to construct the streetscape of the parade. Character models in motion are transformed from 3ds MAX format into CAL3D format. We use the character models of high polygon (about 8600 polygon), medium polygon (about 2800 polygon) and low polygon (about 1100 polygon) to build the real time Yamahoko Parade in Virtual Kyoto. Approximately 730 characters are simulated in this virtual parade to make crowd behavior realistic. In addition, we are trying to generate the synchronized Virtual Yamahoko Parade in high-definition computer graphics with high-quality acoustics, recorded as festival music.

While Figure 1 shows Virtual Yamahoko Parade of the four floats without crews, Figure 3 shows only Virtual Yamahoko Parade of the Fune-hoko float with crews in Virtual Kyoto.

3 Conclusion

We could successfully produce an integrated real-time content of Virtual Yamahoko Parade by using 3D high-definition computer graphics and 3D audio technology and migrating the assets through Vizard into Virtual Kyoto. This research proves, therefore, that we can virtually reproduce intangible cultural material in this case, a very large scale of festival, including its crowd and streetscape. An exhibition of Virtual Yamahoko Parade held at the Museum of Kyoto in January 2010 received favorable comments from visitors. Our next step of the research is to improve the character animation so as to indicate the social context of the Parade spectators. We are also planning to develop the Immersive Yamahoko Parade System so that the user can experience the riding on the top of virtual float with vibration stage.

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References
