

Development of Cultural Capital Content using Ultra-High Resolution Images

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Figure 1. Imaging and high quality replica.



Figure 2. Fly-through content.



Figure 3. AR content.

1. Introduction

Recently, digital archives of famous art works have been developed and their digital content were exhibited in public. In the present research, we focus on old art works of Osaka (a local area of Japan) which are valuable but buried in museum or library archives or otherwise forgotten nowadays. We are aiming at constructing the 'cultural capital content' that makes the art work itself popular and bring benefits of regional promotions for local society. We have already reconstructed the old cityscapes of Osaka using 3D computer graphics and confirmed the effects of the interactive content for education and sightseeing [Hayashi, 2013]. Here, the digital content of a picture scroll of Osaka painted by Shunboku Ooka (1680-1763) was developed using an ultra-high resolution imaging technology. A high quality replica was created and interactive content based on the scroll were developed.

2. Material

Shunboku's picture scroll titled 'Landscapes of Osaka along the Yodo River' (1745), which is part of a collection at the Kansai University Library, was employed as material for digitalization. It has a height of 27cm and is 7m 90cm long, and depicts the landscapes of cities and natural scenes of Osaka along the Yodo River. It is one of the representative art works of its day, although it has not been remembered nowadays because of its location and for political reasons [Nakatani, 2010]. Many names of the cities, mountains, bridges and buildings are written on the pictures, and represent the continuous prosperity of the area. We therefore think this artwork is appropriate for the cultural capital content in Osaka.

3. Ultra-high resolution imaging

To digitalize the picture scroll, we used a Hitachi digital imaging system with resolution of 1200 ppi (pixels per inch) [Hitachi Ltd.,

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2014]. The shooting of the picture scroll was done in nine divided parts using a single-lens reflex camera on a computer-controlled tilting stage (Figure 1 left). For each part, several resolutions of subdivided images were shot in coarse-to-fine order and joined, with each other automatically. The obtained final image of the picture scroll was 12,960 x 376,816 pixels with 16bit/channel and 29GB in TIFF file format. It can be used to create a super high quality replica, which reproduces the surface texture of the original picture (Figure 1 right).

4. Development of interactive content

(a) Fly-through content

Figure 2 shows the display scene of the fly-through content using the Google Earth API. Along the Yodo River, a user can fly over cities in modern-day Osaka and compare the modern city with the images painted on the picture scroll. Using Leap Motion sensor input, the heading direction and the angle of the camera can be changed interactively. Stereo display devices are also available.

(b) Augmented Reality (AR) content

To get information from the replica of the picture scroll, an AR content using smart phone or tablet PC was developed (Figure 3). As an AR platform, Unity 3D and Vuforia were used. Aiming at painted characters on the picture scroll, commentaries, pictures and 3D-CG models are displayed. AR markers using the ultra-high resolution image realized the high recognition ratio. Furthermore, using the same platform, video games for children were also developed to allow them to touch the old artwork.

5. Concluding remarks

The replica and content have been exhibited at several events in Osaka. Many people expressed interest in the artwork of Shunboku and may have rediscovered him as a pioneer of modern Japanese-style painting. It was shown that ultra-high resolution images can be effectively applied for introducing the lost or forgotten artwork to the viewing public. We continue to develop the 'cultural capital content' which can bring benefits for the local society.

References

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