

A Study on 3D Digital Image Applying Oriental Painting Techniques

Yoomi Choi*

Ewha Womans Univ. School of Media Interaction Design

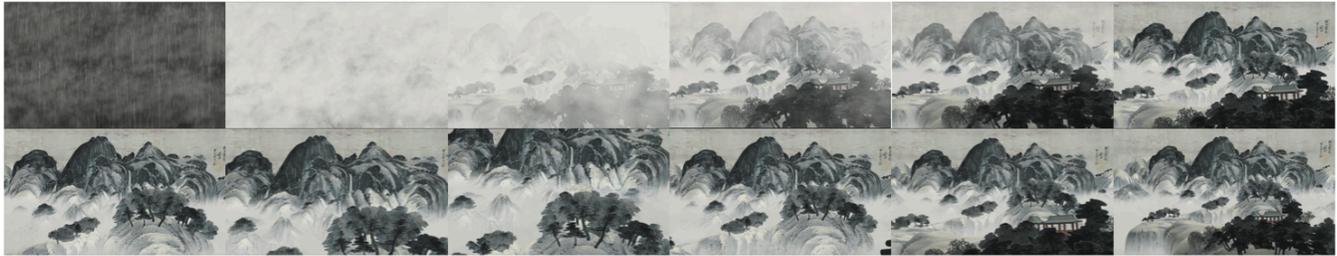


Figure 1: *Inwang Jesaekdo* 1920*1080 px, 3D Animation, 2015

Abstract

With the advent of media, artists have expanded the domains of visual arts through various new attempts to integrate digital technology with arts. Along with the changes in working environment, nowadays, there have been new attempts to reinterpret old masterpiece using digital media. The initial studies regarding 3D image of oriental painting were mainly focused on non-photorealistic rendering techniques. However, the technique has limitations in expressing or reproducing the unique elements of expression used in oriental paintings. The traditional oriental paintings were not expressed with perspective view and shadow; and in a water ink painting, color expression is also limited because of the unique properties of the ingredient, 'Muk (Ink Stick).' Moreover, the oriental paintings have multiple viewpoints in one scene. Therefore, there are difficulties in using tools such as Maya or 3DMax to express the traditional artworks of the East.

In this context, the purpose of this study is to provide alternative solutions to resolve the problems that arise in the process of recreating oriental paintings into 3D image, based on the theoretical framework of spatial arrangement and composition principles. Also, the study reinterpreted the classical works by applying storytelling techniques, which utilize the expandability of time, a main characteristic of visual media. <Inwang Jesaekdo> and <Geumgang Jeondo>, the two major artwork of Gyeongmyeong Jeong Seon, who is one of the most representative literary artists of the Joseon Dynasty, were reinterpreted with 3D digital image, and new design methods and techniques were applied.

Keywords: Oriental Painting Technique, 3D Digital Image

Concepts: • Computing methodologies ~ Image manipulation; 3D Computer Graphics;

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the Owner/Author. Copyright is held by the owner/author(s). SIGGRAPH '16 Posters, July 24-28, 2016, Anaheim, CA, ACM 978-1-4503-4371-8/16/07. <http://dx.doi.org/10.1145/2945078.2945104>

1 Characteristics of Oriental Painting

The colors of the West are thoroughly based on scientific mechanisms. In science, colors are determined by the wavelengths of light and how much of the waves are absorbed and reflected. Therefore, in a typical Western landscape painting, the leaves are green and the sea is blue, expressed in a realistic manner. On the other hand, the Eastern artists did not perceive the landscape paintings as "paintings drawn with black paint," but they enjoyed the nature itself depicted within the art piece. This indicates that "Muk (ink stick)" not only plays a role as a material but also works as a mediator connecting the art work and the viewer beyond time and space.

For western paintings that use fixed viewpoints and perspectives, objects are modelled simply as it is, and the hidden background can be analyzed and inferred by considering the drawing methods used in the painting. Therefore, it is relatively easy to produce and recreate the western paintings with existing 3D software programs such as Maya and 3DMax. However, in the case of oriental paintings, it is necessary for the producer to recompose the space and object based on a thorough analysis of the artwork considering the unique characteristics of oriental paintings described above, and imagination.

2. Design Process

2.1 Storytelling

<Geumgang Jeondo> was painted after sightseeing and observing the 12,000 mountain peaks of the real Mt. Geumgang. Gyeongmyeong Jeong Seon used the bird's eye view technique, which portrays the scene from above, to depict the whole scenery of Mt. Geumgang. The artist maximized the ideality of the Joseon mountain landscape by expressing the rocks and earths with different brush strokes and diluteness.

<Inwang Jesaekdo> is a painting that captured the magnificent landscape of Mt. Inwang shrouded in mist after the rain. The painting was expressed from two perspectives divided. The lower part of the mountain scenery was depicted from a high view point and the upper part was depicted observing the mountain peaks from a low view point. When Jeong Seon was at the age of 76, his close friend, Lee Byungyeon, passed away, and the painting was composed to express his grief.

2.2 Main Components



Figure 1: Modelling and mapping of Mountain

Figure 2: UV Map Source

If you take a look at the mapping image, the modelling process did not consider the Oriental drawing techniques and the vertical lines were stretched to the left and right. This is because it was simply covered with the map image of figure 1. To overcome this limitation, the object was converted into UV image such as figure 2 and each source was located at the appropriate spot in order to spare the lines.

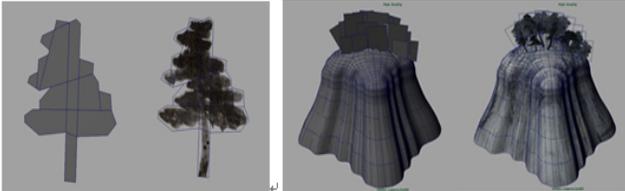


Figure 3: Tree components

Figure 4: Mt. Inwang trees on top of a peak

The trees in the two compositions were expressed as dense forests using the “Mi Joem Jun” technique, which uses midpoints, rather than depicting the exact form. The trees were drawn using different techniques based on its location. The distant trees were produced with one plane geometry and when the camera moved by, the trees near the camera work were expressed by using three plane modelling, intersecting to make them three dimensional.

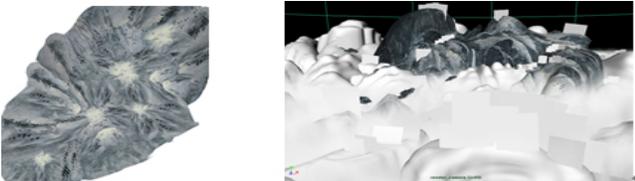


Figure :5 UV image of mountain peak

Oriental paintings often use the aerial perspective technique, which expresses the main central parts with strong colors while making the less important parts gradually shade out into the background margin. However, in this artwork, the margins were included at the map image stage before inserting the mist at the editing stage in order to emphasize the density of the mist at the bottom of mountain scenery.

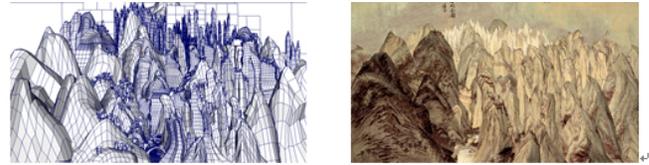


Figure 6: Still Cut of final version, <Digital Geumgang Jeondo>

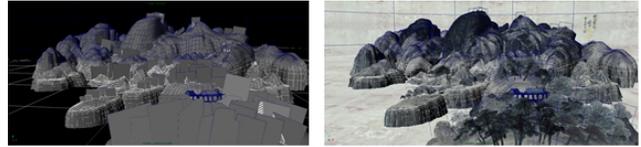


Figure 7: Still Cut of final version, <Digital Mt. Inwang>

3. Conclusion

This study analyzed the spatial elements of animation applying oriental painting techniques, suggested the key points to consider and provided future directions to recreate a 2 dimensional artwork into 3 dimensional digital contents.

Two visual contents, each 2 min, 30 sec length, were produced, interpreting the unique characteristics of the traditional artwork and understanding the story hidden in the painting. With the advent of new media, it has allowed contemporary artists to recreate traditional oriental paintings through new technology and methods. Through these new artistic attempts, artists can now pursue visual expansion from flat painting to 3D digital animation, realize various expressions and create new value to existing traditions.

References

- CHOI, W. S. Inwang Jesaekdo, a landscape painting of friendship. In *Journal of Koreana*. Vol. 20, no. 3, 40-43.
- CHOI, Y., AND NAM, H. W. 2011. A study of space in asian-painting-style animation. In *Journal of Korean Animation*, 71-72.
- DONG Q. 2003. *Art perspectives, Dong Qichang's art theories*. Korea: Sigongsa.
- JEON, E. H. A study on Gyeongjae Jeong Seon's painting techniques. M.A., thesis, Sookmyung Women's University.
- JEON, K. R. 2010. Visual textuality of stereoscopic 3D animation. Producing 3D Contents Using Korean Painting. In *Journal of the Korean Society of Cartoon & Animation Studies*, vol. 20, 31-45.
- JOO H. I. 2009. *Visual media and the society*. Korea: Hanul.
- NAM, H. W. 2010. A study on spatial expression of 3D animation applying oriental painting techniques. M.A. thesis, Ewha Womans University.
- NAM, H. W., CHOO, S., CHOI, Y., AND HONG, S. W. 2009. Producing 3D Contents Using Korean Painting. In *Journal of Korean Animation*, 63-72.