The research of presence in a stereoscopic media art

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Abstract. Studies have been actively dealing with user interaction and the researches on the stereoscopic images in the field of movies, games, and virtual environment. Especially, the research regarding the difference of regular image and stereoscopic image have been conducted mostly in the field of movies or games. The results were differently derived depending on the areas to be applied and types of contents. The stereoscopic art is in an increasing trend in the field of a media art. However, there are not many studies dealing with the influence of three-dimensional images on audiences. Therefore, this study was intended to manufacture media art combined with stereoscopic images and interaction and examine the presence to be conveyed to audiences.

Keywords: Stereoscopic art, Interactive art, Motion interaction, Presence

1 Introduction

One of the technologies that recently represent the media is the stereoscopic image. Artistic and academic studies dealing with three-dimension have been expanded with the scope to daily lives as a result of technological development. The price of three-dimensional devices such as 3DTV has become cheaper compared to the past that they are now much disseminated to daily lives of people. In addition, 3D movies such as ‘Avatar’ made the greatest hit, and audiences tend to become familiar with stereoscopic images. Three-dimensional technology has been widely used in the field of movies or games. Furthermore, it is in an increasing trend of attempting to utilize stereoscopic image technology in the area of media art. Studies have been steadily conducted dealing with three-dimension in the field of art since it covered traditional fine art. It was from the ancient times when three-dimensional images were specifically considered, and the cornerstone of utilizing the perspective was when the fine artist from Firenze named Giotto di Bondone started drawing pictures for in-depth organization of space [1].

The stereoscopic images provide a new experience to audiences expanding the depth and scope of what audiences feel. Therefore, they can be used as a new media expression method [2, 3]. Media art works using the stereoscopic images are most likely performed by recording rendering images in the use of animation modeling tool.
or stereoscopic images recorded by camera without user interaction. The user interaction has been studied to improve immersion of audiences through direct experience. The interactive stereoscopic media art that combined with stereoscopic image and user interaction is expected to share sensory feeling more by artists and audiences. Therefore, we have manufactured the media artwork combined with stereoscopic images and interaction and proceeded the study about the measurement of user experience.

2 Stereoscopic Media Art Design

We have used the media artwork of ‘Garden Party 2’ applied with interactive technology depending on the participation of audiences and stereoscopic image technology on the experiment at the same time. ‘Garden Party-2’ was organized with the three-dimensional space as shown in the figure 1 and set sunflowers in the background of ‘alfalfa field Saint-Denis’ by Georges Pierre Seurat. The background and sunflowers represent the image in black and white color in the beginning of artwork expressing the cold feeling of the people in the city that has lost the meaning of communication. The color of flowers changes depending on the movement of audiences representing the restoration of vitality of tired people in the city. This work was applied with motion interface in the use of Kinect sensor for the interaction with users. In order to create the work, C++ programming languages were used utilizing the sensor values of user interface entered by users to change the movement of objects in the artwork. The transformed space was applied with OpenGL graphic library producing stereoscopic images in frame sequential method. A 3D DLP projector was used for output interface, and audiences wore active-stereoscopic glasses that interaction was available by using stereoscopic images.

Fig. 1. Three-Dimensional Space Configuration of <Garden Party>

In order to compare the effect of general images and stereoscopic images, ‘Garden Party-2’ was manufactured by general image created by using one virtual camera and
stereoscopic image created by using two virtual cameras. Two works were installed in one exhibition proceeding an experiment conducted on users that experienced both work. Hereupon, elements on the presence were analyzed with both general images and stereoscopic images. In order to compare the presence provided by general images and three-dimensional images to audiences, MEC Spatial Presence Questionnaire (MEC-SPQ) survey questionnaires were used [4]. In this study, four process factors normally used in the MEC-SPQ and two of the additional personality factors were utilized for the experiment. Four process factors were attention allocation, spatial situation model, spatial presence: self-location, and spatial presence: self-action. Two of the personality factors were higher cognitive involvement and suspension of disbelief.

3 Result

In this paper, an experiment was conducted on college students majoring in media art by using the interactive media artwork ‘Garden Party-2’. The influence of general images and stereoscopic images was analyzed with respect to the six elements of MEC-SPQ. One element was comprised of four questions, and questions were randomly listed using Likert scale to survey. According to the result of average of six elements, stereoscopic images were turned out to provide more of presence than general images. The results of the matching sample were derived that the average value of dependent variables was higher in the stereoscopic images in all the six elements. Average and standard deviation are expressed in the graph as follows figure 2.

![Fig. 2. Statistical Graph for Sample Correspondence of General Images and Stereoscopic Images](image-url)
References