Presentation of Video Continuity Using 3D Floating Technique for STEAM Education

Namje Park

Dept. of Computer Education, Teachers College, Jeju National University, 61 Iljudong-ro, Jeju-si, 690-781, Korea
namjepark@jejunu.ac.kr

Abstract: The purpose of this paper is to provide students on natural sciences track and science-focused track who are talented in science and mathematics and have interest in the convergence and application of related knowledge with the opportunity to interpret the rapidly changing media industry in terms of science and actually apply related technologies to grow into creative intellectuals of the future society. Furthermore, this course intends to encourage students to collect information for the coherent theme, the high-tech movies, and reinterpret them in terms of science to turn the media that had been felt distant into the subject of study and also produce movies of their interest to realize that the industry, technology, art, and science are indeed interrelated with each other.
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1. Introduction

Such computational sciences and IT education can also be found in the concept of STEAM education. Yakman defined the boundaries of Science (S), Technology (T), Engineering (E), Arts (A), and Mathematics (M) in STEAM education. He suggested that the contents of computational sciences belong to the Computer in Engineering (E) field and the contents of IT belong to informational technology under Technology (T). The STEAM education using IT is an attractive educational method for the digital generation students to easily and pleasantly learn the contents of mathematics, sciences, and technology. The educational methods that integrate IT and other fields of academia have been attempted before STEAM education. In addition, the reason for a brighter footlight for IT as the transition from STEM education to STEAM education occurs is that occupy a large section in the field of Art in the digital environment (Kim, Y. 2012, Yeonghae Ko 2013, Yilip Kim 2012).

When producing a high-tech movie using advanced scientific principles, it can become a movie that no one wants to see if the producer only depends on scientific knowledge. Also, subjects included in the curriculum but seem unrelated with each other such as writing, art, and music are actually quite inevitably interrelated with each other. If even a few elements of these subjects can be incorporated into a task, it will be possible to produce the outcome that everyone wants to see, realizing creative design and fulfilling the emotional touch of students that carried out the task. The educational goal of this course in relation to the curriculum is to enhance positive motivation for achievement for students concerning social and scientific tasks of their interest they would perform in the future by giving them the chance to have such an exciting and composite experience of a success (Yongwan Kim 2010, Kim Tae Hyun 2003).

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2. Understanding 3D Floating Technique and Organization and Presentation of Video Continuity

2.1 Truth of Hologram in the Movie (Movie using 3D floating technique)

We can draw a rough picture in our minds about the technology in near future while watching SF (Science Fiction) movies. The director of the movie expresses his or her imagination through the movie, and such imagination stimulates the technology in the related area that we often see products or technologies that actualized the imagination in everyday living. You must remember the scene from “Iron Man”, the movie by Jon Favreau that enjoyed world-wide popularity where the hero uses hologram to design a special suite and test it directly in the holographic environment (Ko, Y. 2011). The holographic technology that looked so cool in the movie... is it possible to build that sort of hologram with today's technology? Unfortunately, it is not. Well, then let's see how advanced today's holographic technology is and the essence of the holographic technology we see. To understand the technological meaning of the hologram, we need to take a look at where the word and hologram came from. According to the dictionary, "hologram" is a compound word made from "holos" which means "whole" and "gram" which means a picture. In other words, it means a "whole picture." Let's go back to the scenes from the movie in a more realistic view this time. I said it is difficult to realize the scene where the hero puts the holographic image in the air and directly tests the suit with it, but what if we do it another way? The answer is yes. To form an image in the air without any medium, it will take hundreds or thousands of laser light source and a supercomputer to send and process data that it is impossible in reality, but if we use the reflection technique that uses a medium that acts as a screen that is hardly seen with eyes or 3D floating technology (hologram-like technology) that uses direct projection, we can put an image in the air and move it as we wish like the hero in the movie (An, J. 2012, 2011, Park, N. 2011).

Let's take a closer look at the hologram that uses principle of reflection. The hologram that uses the principle of reflection originated in approximately the 19th century. Magicians at the time put a ghost on their stages, and they used the optical illusion called "Pepper's Ghost" to delude the audience (Kim, Y. 2012, Park, N. 2010).

The basic principle is that a transparent screen tilted to 45° is installed and an ordinary screen is installed underneath to reflect the image, and when the image is reflected on the transparent screen, it looked as though a person or an image is floating in the air. This technique which started from a very simple principle is evolving into a new type of holographic technique by combining various information technologies (Kim, Y. 2012, Park, N. 2011, Jeon, H. 2013).

The hologram shown in "Iron Man" can be realized even by us today by combining various information technologies capable of interacting with the hologram. For example, the reflective hologram combined with various information technologies such as the motion sensor for controlling motion, the sound sensor for controlling sound, and tele-presence which transmits images in real time to enable conversation or conference using holograms can enable us today to put an image in the air to control it and use it to talk to a person at a distance in real time as if we are talking face to face as they do in the movies (Soonwoo Park 2014, Daniel F. Keefe 2013).

2.2 Imaging device to use for 3D floating technique in this class

A transparent acrylic panel (1.2m×2.4m) was installed at 1m above the floor at 45°, and 9 sheets of whole paper were laid on the floor in front of the panel as the reflective screen, and the single-focus beam projector was used as the light source (Figure 1).

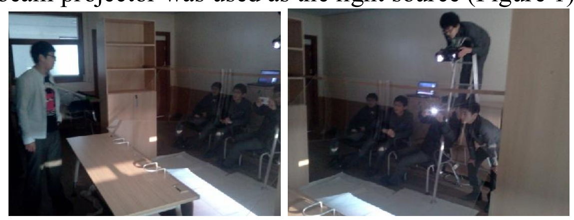


Figure 1. Imaging device to use for 3D floating technique.

2.3 Explaining the example of the continuity for using the advantage of 3D-floating hologram technique

A transparent acrylic panel (1.2m×2.4m) was installed at 1m above the floor at 45°, and 9 sheets (Figure 2).

Title: Versatile A Team: A, 5 Members

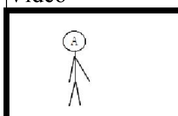
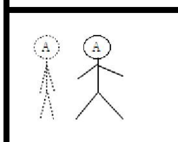
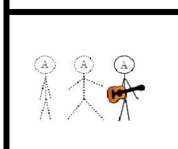
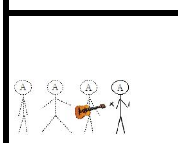
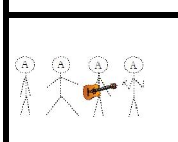
Cut	Video	Context	Audio	Time
1		A sings to the music and bows.	Record A's singing part only.	5 Minutes
2		A dances and bows while the hologram from Cut 1 is floating.	No sound	5 Minutes
3		A plays guitar and bows while the hologram from Cut 2 is floating.	Record guitar sound.	5 Minutes
4		A conducts and bows while the hologram from Cut 3 is floating.	No sound	5 Minutes
5		Float the image from Cut 4 to retain the same image quality.	No sound	5 Minutes

Figure 2. Example of the continuity for using the advantage of 3D-floating hologram technique

3. Conclusion and future study

STEAM is an acronym of Science, Technology, Engineering, Arts, and Mathematics. To realize the STEAM education, the factors on how to interrelate and integrate science, technology, engineering, art, and mathematics as well as the factors that are needed in realizing the STEAM education in creativity in addition to the considered factors in contents need to be decided, which in reality, makes the creation of STEAM materials into a system science or system engineering (Kim, Y. 2012, Yeonghae Ko 2013, Yilip Kim 2012).

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Corresponding Author:
Prof. Namje Park
Dept. of Computer Education, Teachers College
Jeju National University
61 Iljudong-ro, Jeju-si, 690-781, Korea
E-mail: namjepark@jejunu,.ac.kr

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