VR Animation Assignment for Students with a Background in Traditional Hand-Drawing Techniques

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Figure 1: Examples of VR animation by students

ABSTRACT

Media technologies, such as virtual reality (VR), have begun to revolutionize. Consequently, the seamless presentation of media, such as animation, film, and games, has developed remarkably. This integration of advanced media and experiences into the educational environment offers great potential[Mones 2017]. In a similar vein, we believe that such integration leads to the revitalization of the entire industry, which allows students who have a background in traditional hand-drawn methods of expression practice using advanced media and develop their skills. In this submission, we present a drawing expression challenge in 360 degrees of space to students with background in traditional painting. To ensure that this assignment is free of technical hurdles, no game engines or VR painting applications will be used. Only paper, art materials, and common painting and video editing software will be used by the students to complete the assignment. Figure 1 shows the examples of VR animation by students.

CCS CONCEPTS

• **Applied computing** → **Media arts**.

KEYWORDS

Hand-drawn animation, traditional art, VR, education

1 CONTEXT

GEIDAI (Tokyo University of the Arts) is Japan's only national art university. It has nurtured and produced many artists, educators, and researchers who are at the forefront of their fields in Japan and abroad. This project was created as part of a class offered in the first year of the master's program in the Department of Animation at our university. Many of the students who take this course have a background in traditional techniques such as oil painting and hand-drawn 2D animation. In addition, this subject is positioned as a development to various expressions of animation using new techniques after the exercises of drawing, stop-motion puppet production, and motion expression focusing on narrative expression. In this course, 40% of students have never watched VR, and 95% have no experience in VR video production.

2 OBJECTIVES

This assignment aims to achieve the following objectives:

(1) Provide students with an understanding of modern VR technology and its application to creative content. The activity will focus on how the advanced medium of VR is being extended as a visual representation.

(2) Understand the concept of physical perspective in an image, which is absent in traditional flat images.

(3) Understand the concept of viewers having 360 degrees of visual freedom, which is absent in conventional flat images.

(4) Develop effective spatial expression and video production by following the above points and applying the hand-drawn expression cultivated by students.

(5) Master technical methods involved in the conversion of 2D methods to VR videos.

Table 1: Assignment Metadata

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Summary	Create a VR animation that combines an immersive graphic experience with animation by using traditional hand-drawing/painting techniques.
Learning Outcomes	Supports key VR creation concepts, including cube-map and equirectangular. Students need to research the parts of a VR experience to achieve the desired VR animation expression.
Classification	Hand-drawn animation, 360-degree movie, VR
Audience	Graduate students at all levels
Dependencies	Basic experience in painting/drawing, ability to use common paint software
Prerequisites	Any form of hand-drawing/painting and animation experience
Strengths	The scope of the assignment goes beyond pure hand-drawn animation skill development to help students understand the wide context.
Weaknesses	The development of stereoscopic vision or 6D is difficult to implement immediately.
Variants	Unlimited direction options and drawing/painting techniques
Assessment	Each student will be assessed on the basis of their individual 30-second-long VR animations, as well as their brief presentation on their idea and concept.

3 MATERIALS

This course begins with a lecture-style presentation on the history of VR and its applications to movies, games, and other content. This introduction gives input on visual effects and experiences inherent in VR before moving on to the assignment. This assignment is an individual production assignment. The two ways to create hand-drawn VR animations will be introduced: (1) analog hand-drawing using a cube-map and (2) digital painting using an equirectangular style of painting.

(1) The first method is done by replacing a 360-degree field of view with dice and drawing six squares (east, west, north, south, north, south, north, east, south, north, south, and earth) on the geometric net. The geometric net is imported to a PC and converted into a video format that can be viewed in VR using video editing software. This method is suitable for students who want to use paper, paint, and other materials in their presentations as it allows to draw on physical paper.

(2) The second method is done by dragging the viewpoints in the 360-degree direction by setting to a spherical panorama using digital painting software. This method is suitable for students who are used to digital drawing. It allows the use of photos taken with an omnidirectional camera as a guide.

(3) The third method is to paint directly in the equirectangular format. This method is suitable for students who are not used to working digitally or who choose a technique that is not suitable for painting in multiple aspects, such as paint-on-glass3.

Figure 2: Students' cube-map drawing on paper
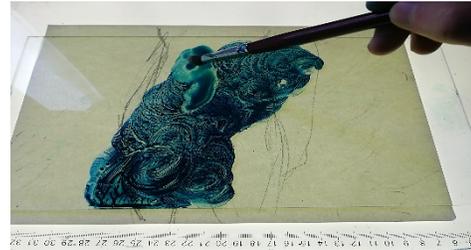
Figure 3: Students' paint-on-glass in the equirectangular format.

After experiencing these three methods, each student needs to choose the method that best suits them.

Subsequently, they will be asked to complete and submit a VR animation that is approximately 30 seconds long. In this assignment, the emphasis is on the experimentation rather than the completion of the work. We encourage students to repeat the cycle of making a prototype and then watching it on a headset and aim to express their intended visual experience.

4 CONCLUSION

VR animations with a painterly approach using charcoal, paint-on-glass, colored pencils, and digital hand-drawing, which focus on the physical perspective, are the results of this assignment (Figure 1). Through this assignment, students will understand that they would have different camera perspectives across different positions and distances on a 360-degree sphere. Students who drew animations with extensive movement of objects learned that the speed of movement needed to be adjusted to ensure that the viewer could follow. They also understood that when multiple objects and characters are shown on the screen, their positioning and movement must be closely controlled for the viewer to understand the development.

Thus, students who primarily work with analog methods can have a practical 360-degree production experience and understand the context of a broad, seamless media representation by accomplishing assignments that are technologically tractable for them.

REFERENCES

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