인디음악에 사용되는 애니메이션(GLOOM) 제작에 대한 연구

김 태 은[1]

[1]남서울대학교 멀티미디어학과

A study on the production of animated GLOOM used in indie music

Tae-eun Kim[1]

[1]Department of Multimedia, Namseoul University, Cheonan 31020, Korea

[요　　약]

Low poly기법을 기반으로 제작된 애니메이션 Gloom은 무명가수의 언더그라운드 음원을 애니메이션으로 표현하여 제작 의도를 표현한다. 본 논문은 모델링 과정, 리깅 과정, 애니메이션 과정, 렌더링 과정을 포함하는 애니메이션의 제작과정에 대해 다루고 있다. 음원을 의뢰자의 의도에 맞게 순수 창작 애니메이션으로 제작하는 과정을 심도 있게 고찰함으로써, 결과적으로 유사 창작 작업을 하는 순수 창작자들에게 가이드라인을 제공할 수 있을 것으로 생각된다.

[Abstract]

The animation "Gloom" based on the low poly art expresses the intention of the production by expressing an music as an animation. The paper describe the production process including the modeling, rigging, animation, and rendering. Furthermore, the production process for pure creative animation with client's intention was also considered. Therefore, it can provide guidelines for pure creators who do similar creative work.

색인어 :　디지털 영상, 기술, 인간, 예술, 시대성, 애니메이션

Key word :　Digital imaging, Technology, Human beings, Art, Trend of the times, Animation

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Ⅰ. Introduction

In modern visual culture, a video that needs a narrative like animation, which can be called one big genre, contains the meaning that composes a story for each visual element reproduced. It is important for the singer to express the abstract thinking well in order to express the animation that is made according to the sound source which is the musician 's creation.

In this sense, animation works as an element of psychological expression or viewpoint of the character because all movements are adjusted to the time standard of frame, expressing the ideology that the director intends to express.

The 3D animation "Gloom" aims to understand the basic principles and knowledge of low poly animation and to improve the production techniques of animation through the production of the "Gloom" which works in various expressions and meanings. The "Gloom" is animation using character without expression to criticize society that even lost oneself and can not find happiness. This paper describe the production process of 3D animation "Gloom".

In chapter 1, paper shows the introducing of production process widely with Fig. 1. In chapter 2, we can see the character modeling process. In chapter 3, I will describe rigging and animation process. Chapter 4 describes the rendering production process. In chapter 5, I analyzed the low poly animation and animation sound. Finally, I will discuss the social role of 3D animation comprehensively. Through the above introduction and analysis, we want to make the audience understand how "Gloom" is made. The authors of this paper had a deep understanding of the basic principles of low poly animation. Also, the animation production technology improved with its practical application.
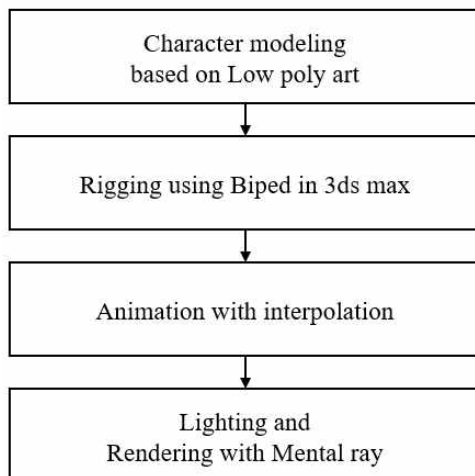

Fig. 1. The flow of production process

Ⅱ. 3D character production

2-1 3D graphic modeling

It is very difficult to accurately convey the concept and definition of animation. This is probably because there is a large discrepancy between the general understanding of animation and its attitude toward more professional recognition.

In generally, the animation is known as a genre of movie that makes it look like moving picture or object using frame shooting. However, the animation has a wide range of categories, including cartoons and abstract art. Our animation is 3D animation with x-axis, y-axis, and z-axis, and character can move in 3 dimension.

The 3D computer animation has made many advances in space exploration, military projects, medical research, educational textbooks, internet, and games. In recent years, the filed of 3D computer animation is expanding widely such as music video, short animation, special effects, advertisement, 100% computer animation series, real-time animation, and full-length animation for theater.

3D graphics refers to three-dimensional representation of geometric data of a model stored in a computer and then processing and outputting the two-dimensional result. Basic programs include Autodesk's 3ds Max, Maya and Maxon's CINEMA 4D, and Pixologic's ZBrush.

3D graphics production process is basically divided into three stages: modeling, animation, and rendering. Among them, modeling shows how objects are formed by a series of calculations or physical simulations. 3D modeling can be classified into three types: low-polygon modeling (less than 1,000 to 5,000), middle-range modeling (less than 5,000 to 10,000), less than 10,000 to 200,000 modeling There is High Polygon modeling. In this paper, we study the low polygon modeling using Low Poly Art [1] and Fig. 2 shows the comparison of low poly and high poly.
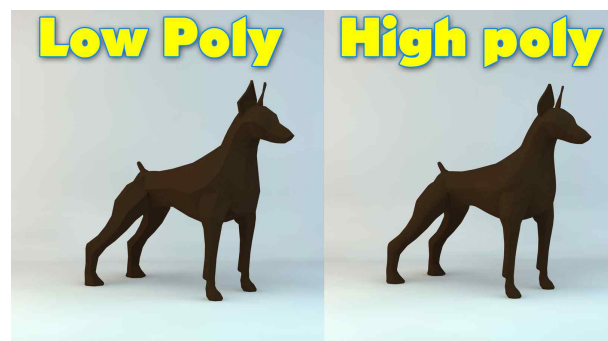

Fig. 2. Low polygon and high polygon

2-2 Character modeling

The overall shape was made of a small number of polygons with reference to low poly art. Since the face starts from the basic shape sphere and there is no expression, it only creates basic shape, divides it into halves, and works symmetrically using Symmetry function. Some polygons in the head is copied to make hair. The body is also divided into halves using the basic figure cylinder and starts from the waist. After making the waist and chest line, the arm is pulled out from the shoulder part and the leg is pulled out from the pelvis part, and an odd number of edges are put on the joint part to prevent it from being distorted when moving. When the shape of the body is adjusted to a certain degree, the costume of the character is expressed simply. Body and face are attached to one object with Attach function, and the neck is trimmed with Target weld function. Select the entire polygon as the finish and set Smooth to 1 to complete the hard look. The modeling itself is simple, allowing you to specify a casual color using the default Shade. Fig. 3 and 4 shows the character modeling in progress and completed character model, respectively.
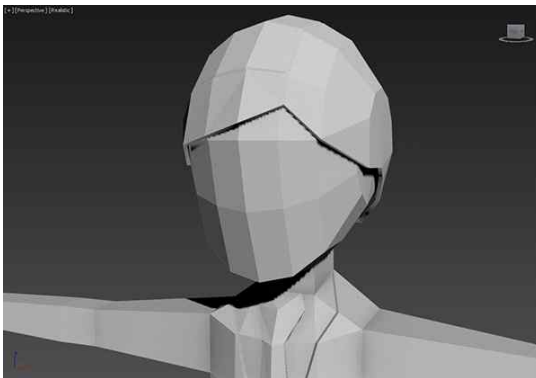

Fig. 3. The character modeling in progress
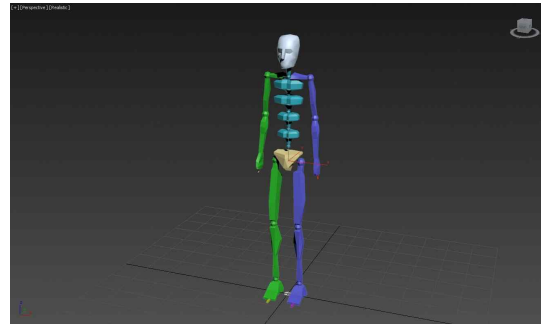

Fig. 4. The completed character modeling

Fig. 5. Biped

Ⅲ. Character motion representation

3-1 Character rigging

To move a completed character, you have to plant a virtual skeleton like a human bone, which is called rigging. Biped, Bone, and CAT are used as rigging methods, and Biped is used in this paper and we can see the Biped at Fig 5. Biped is the basic skeleton model provided by 3ds max. Then, we create the suitable size skeleton for rigging. Add a skin to the character's modifier list and connect the biped to each part. After that, adjust the range of influence for each part and check the movement to complete the character that can move. Thus, the character composition is finished by making Extra characters and it shows in Fig. 6 and 7.

Fig. 6. Extra character model 1

Fig. 7. Extra character model 2

3-2 Character animation

The 3d animation is similar to clay animation. You can move the Biped placed on the character to create the desired posture and insert the keyframe at the desired point. Using Biped, simple basic movements exist as samples, and the walking motion is adjusted by adjusting the number of steps and stride. Camera movement was also created by inserting a key frame in the camera object itself and adjusting the angle and zoom in / out. The motion between the frame and the frame is automatically filled using interpolation in 3d max. As shown in Fig. 8, Fig. 9 and Fig. 10. there is nothing in 8 frames, but it can generated by interpolation.
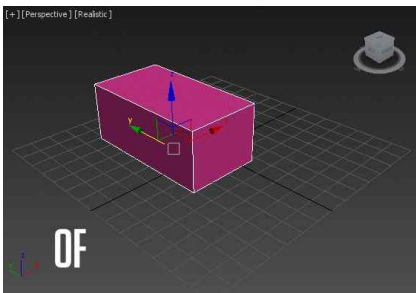

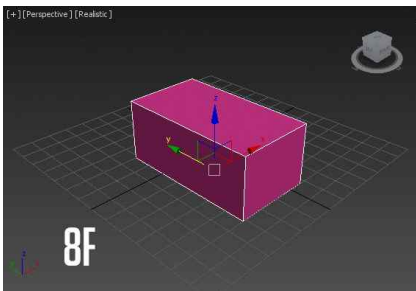**Fig. 8.** Creating the movement by interpolation

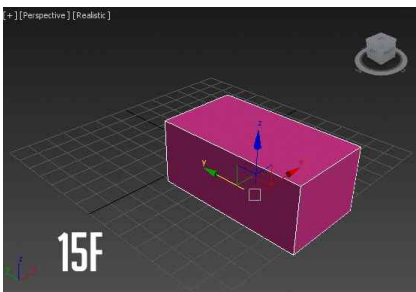**Fig. 9.** Creating the movement by interpolation

Fig. 10. Creating the movement by interpolation
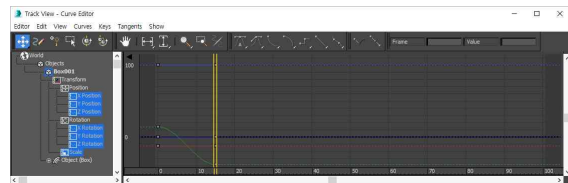

Fig. 11. Frame-by-frame movement in animation

Fig. 12. Curve Editor

However, there may be some uncomfortable or different movements in these movements, so it should be modification the X, Y, Z Position / X, Y, Z Rotation / X, Y and Z Scale in the Curve Editor. Fig. 11 and 12 shows the movement by frame and curve editor, respectively.

IV. Rendering

4-1 Lighting

The lighting is one of the most important elements in rendering. It is a step that plays the same role as the lighting of a movie or drama production, but it brings real life to 3D animation. The purpose of lighting is to provide an appropriate brightness on the screen to show and to describe the specific mood. The most basic lighting, the 3-point light, sets the foreground to illuminate the subject and the backlight to the opposite side to eliminate strong contrast from the foreground and illuminate the back of the screen with depth of field. As shown in Fig. 13, these three light sources are the source of the ray directing to realize 3D [2] [3]. The daylight in the Fig. 14 used Day light, which is a point light that is very far away like the direct sunlight. This Day light can be used to create the light of the time of the day in conjunction with the current time, expressing day and night using this function. In the case of the indoor scenes, day light was also used as daylight and mental sky render of mental ray renderer was used as auxiliary light to express the light coming from the window.
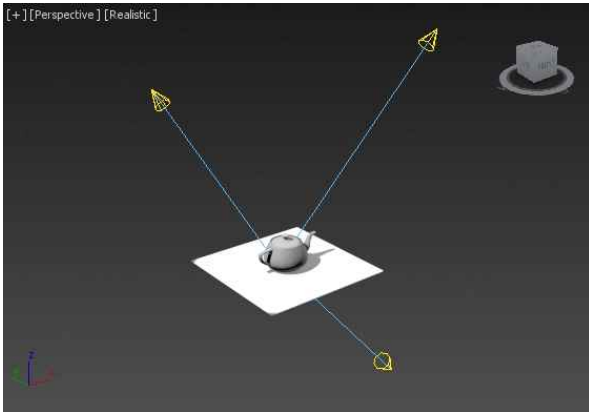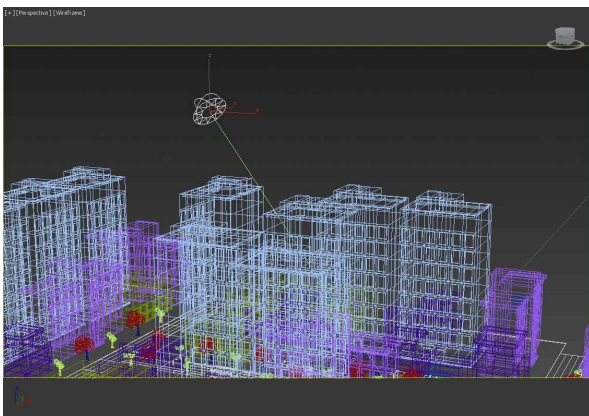
Fig. 13. 3D-point Lighting

Fig. 14. Daylight applied to outdoor scene

4-2 Render Setting

Rendering is the task of transforming a three-dimensional scene into a two-dimensional image. Each 3d authoring tool has its own renderers. Max has a default renderer called Scanline and Mental ray. The scan line is a local illumination, which is a one-dimensional illumination method, but the mental ray supports Global Illumination, and can be expressed in terms of diffusion, reflection and diffuse reflection of light. Mental ray supports many Shades, which upgrade the rendering quality. In order to give the casual feeling of the image, only the basic Shade was put on the color and the mental ray's light expression was used to direct the figure as if it were moving. When rendering, I did not create it directly as a video, but extracted one frame as an image, and after Effects imported all the sequences to create a clear image [4][5]. and Fig. 15 are still images from animation using mental ray.

Fig. 15. Still images of the "Gloom" using mental ray

Ⅴ. **Gloom Animation Analysis**

5-1 Low poly animation

The 3D modeling is becoming more and more realistic, but low poly art is far from realistic. The low polygon art technique is suitable for short images because it has a short polygon rendering time and can give a unique retro feel. In this paper, the low poly technique was applied to the background music for the sponsored sound source.

Editing is the final step in design, animation, video, and so on. It should be as cautious and important as it is.

Adobe After Effects is the best program for editing animations working with MAYA, although there are a number of image editing programs such as Adobe Premiere, Sony Vegas, Edius and Apple final cut studio. In addition, it is easy and excellent in synthesis as well as editing. Especially, it is the most famous program for motion graphics, and the monitor image that is about 2/3 of the image is also produced by Adobe After Effects.

Fig. 16. After Effects work screen

Fig. 16 shows the After Effects work screen. After loading the images of the cameras that have been set up for each object, cut them forward and backward appropriately for each image so that they are connected to each other. Then, set the background sound and the effect sound to the correct position and adjust the volume with the key frame. If the text needs to be inserted, write the desired text at the desired position, adjust the font, size and color, and then finish the editing by giving transparency or effects.

After finishing image editing, effects, and motion graphics, the final image is extracted when the final rendering is done.

5-2 Animation sound

In the animation production process, various sounds are rewritten and effects are added for realistic expression in animation. Sound effects can be broadly divided into Background, Effect, and Foley. Sound effects enhance dramatic action characteristics and can highlight dramatic images of action. Even if the same scene, the image of time and place is set differently depending on which sound is added and removed. In this paper, we could find the background sound in cooperation with indie singer. The scenario was created by referring to the composer's intention, and the concept was set according to the music's mood, and then the tasks described above were performed [6].

Ⅵ. Conclusion

The 3D animation is being used in various fields and the 3D market is growing. Thus, potential of 3D animation is very high, the animation character industry is deeply involved in our lives. Also, it has a large industrial ripple effect by linking with other industries and expanding its business through various licenses. In this paper, we have studied the method of creating pure animation in accordance with the client's intention by using low poly technique.

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Tae-Eun Kim

1989: B.S. degree in Electrical Eng. from Chung-Ang Univ. Seoul Korea.
1992 and 1997: M.S. and Ph.D. in Electronic Eng. from Chung-Ang Univ. Seoul Korea.

1995: Samsung Electronics Human Tech Paper Award (Silver Award)
1997: Acquired 3 patents related to image processing
1997:~: Professor in Dept. of Multimedia, Namseoul Univ.
Research area: computer vision, Augmented reality, Pattern recognition.