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Unreal Engine Empowering Mythological Theme Film and Television Production-Taking *Liaozhai* Adaptation Creation as an Example

Qin Jiayi*, Zhou Jiani[1]**

**Undergraduate Student, Zhongnan University of Economics and Law, China*
***Assistant Professor, Department of Film and Visual Effects, International College, Dongseo University, Korea*
E-mail: moses472530@gmail.com

Abstract

Under the new media era, the film and television post-production technology is changing day by day, in order to explore how to utilize the powerful functions of the Unreal Engine for the production of mythological themes in film and television. This paper in-depth study of the specific functions of the unreal engine on the film and television creation of help, analyze the evolution and development of the creation of mythological themes, put forward the problems it faces. Based on the creation needs of unreal engine and mythological works, this paper uses unreal engine to adapt Lu pan from Liaozai to explore its complete production process, and the production results show that unreal engine greatly improves the quality of the screen and the presentation effect, reduces the cost of the film's production, and improves the collaborative ability of the production team and the ability of creativity. However, the production process still requires high hardware equipment and paid plug-ins for Unreal Engine. We provide the establishment of the process for the combination of Unreal Engine movie and television production and mythological theme re-creation, supplements the production details, and provides suggestions for its further improvement.

Keywords: *unreal engine, mythological themes, movie and television production, liaozhai.*

1. Introduction

Since the inception of cinema in the 1960s, the pursuit of enhanced visual presentation has never ceased. The post-production phase in filmmaking has evolved from simple computer techniques to a more specialized industrial system. Workers in the film industry continue to explore film production technologies to create images that are more artistically valuable and adhere more closely to logical realities, fostering creative development in the film sector. The rapid advancements in post-production technology, along with the widespread application of virtual reality, have paved new paths for film production in China, presenting unprecedented opportunities and challenges to the industry. In this context, it is essential to base ourselves on the innovation of post-production technology to revisit and rethink the adaptation and creation of traditional cinematic themes. Chinese mythological themes, with their profound cultural and historical depth, extensive time spans, and historical richness, dictate that the production of mythological and epic films requires a

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Corresponding Author: moses472530@gmail.com
Tel: *** - **** - ****
Assistant Professor, Department of Film and Visual Effects, International College, Dongseo University, Korea

perfected industrialized production process, innovative narrative techniques, and cultural dissemination. Random adaptations and low-budget, poorly crafted productions, coupled with a lack of a professional cinematic industrial system, have resulted in visual effects and narratives that fail to attract the general public, compromising the quality of Chinese mythological films and causing the public to lose interest and confidence [1].

Altough Chinese filmmakers have used advanced film production technologies to create excellent works such as Painted Skin and The Investiture of the Gods based on Chinese mythology, these successful films are based on substantial production budgets and long production cycles. They require continuous technical experimentation, and their professionalization and scale management are not yet mature; the production processes are not yet perfected. Currently, China's film industry is still in a developmental stage and has not yet established a mature cinematic production mechanism; the production workflow still needs optimization [2]. This paper will explore modern presentation methods by combining mythological themes with the Unreal Engine, taking the film adaptation of Strange Tales from a Chinese Studio as a case study, fully utilizing new technologies to refine the production process of mythological films, reduce their production costs, and explore new possibilities for mythological film themes.

2. Theoretical Research

2.1 Preliminary Research

2.1.1 Unreal Engine Empowering Film Creation

The Unreal Engine is a platform or system designed for game design and production. Currently, it is the world's most renowned and widely licensed top-tier gaming platform, occupying 80% of the global market share. It facilitates rapid game development using pre- written editable game systems or core components of interactive real-time graphics applications. Moreover, resources provided by the Unreal Engine, such as images, music, and animations, can also be utilized by filmmakers and television producers to craft highly realistic 3D models and authentic environments. Using Unreal Engine's high-precision models and texture mapping techniques, creators can design character models and environmental layouts that align with the narrative's ambiance. Additionally, Unreal Engine offers robust collaboration features and compatibility with other software, enhancing creative possibilities. Utilizing Unreal Engine for virtual cinematography involves constructing virtual scenes and simulating cameras to film without physical sets, thereby improving shooting efficiency and reducing costs. This breaks free from the limitations of actual set conditions and innovates filming techniques. Its real-time rendering technology has been a revelation for many in the film industry. The Unreal Engine comes equipped with common tools for animation production, including a binding system for film software and a curve editing system, as well as a pose library for efficient resource management. Motion capture systems can also be employed to record character actions in advance. Film's skeletal binding, animation adjustments, and collaboration all occur within the same engine, supported by real-time rendering technology that allows immediate previewing of animation effects to ensure natural and fluid movements. Its particle system and material editing capabilities produce high-quality visual effects, such as supernatural phenomena and fantasy scenes, to enhance the narrative's mystique and appeal [3]. A major highlight is the Unreal Engine's more scientific approach to implementing a full dynamic global illumination solution (Lumen), which effortlessly displays both specular and diffuse reflections of objects, dynamically responding and transforming with object movement to match environmental settings. It even allows for the specification of light sources and luminous bodies through material settings. Under the full dynamic global illumination

solution(Lumen) lighting technology, real-time changes in weather and the angle of sunlight are automatically generated and processed by the built-in advanced renderer, ensuring precise color correction and light control to match the visual effects and artistic style of the film [4]. According to Chen Xuguang and Zhang Minghao (2023), digital imaging technologies represented by game engines and XR virtual production have comprehensively revolutionized the film industry's workflow, reducing the cost and complexity of film production [5]. With the Unreal Engine, filmmakers can effortlessly create stunning visuals that transport audiences into a rich and diverse cinematic world.

2.1.2 Re-creation of Mythological Themes

China boasts a rich mythological heritage, with thousands of years of accumulated myths, folk tales, and ancient texts, such as the imaginative world of The Classic of Mountains and Seas which details a universe where everything has a spirit and mythical narratives. This text serves as a referential blueprint for native fantas [6]. The Investiture of the Gods and Journey to the West are also two classic novels of gods and demons, representing a rich treasury of Chinese mythological culture. Mythological themes in films often draw from Strange Tales from a Chinese Studio (commonly known as Liaozhai), it is a collection of short stories written by the famous Qing Dynasty novelist Pu Songling. Comprising 491 short stories, the author employed a Romantic approach to crafting these tales, creating fantastical settings and portraying a world of ghosts and fox spirits, essentially critiquing various societal vices present in real life. The fantastical stories and character portrayals in Liaozhai lay a solid foundation for contemporary Chinese films with magical realism elements [7]. Its concise narrative makes it highly suitable for film script adaptations, with its mysterious, fantastical, and horrific elements providing strong imagination and visual impact.

The adaptation of mythological themes into film and television has been a long and complex process. Taking Strange Tales from a Chinese Studio as an example, since the 20th century, with the introduction of Western film production techniques and in-depth studies of the "epic in short" textual characteristics of Liaozhai, the film Qing Xu Meng directed by Ren Pengnian was released in 1922. Subsequent films such as Xiao Fu Geng and Tian Qi Lang emerged, with adaptations of Liaozhai flourishing across Mainland China, Taiwan, and Hong Kong. After the economic reforms and opening-up policy, television became widespread, and in 1980, Yang Jie directed Laoshan Taoist the Taoist of Mount Lao, the first TV adaptation of a Liaozhai story. From 1980 to 2020, more than twenty television series based on Liaozhai were produced. During the process of adapting Liaozhai for film and television, production techniques and visual representation methods have continuously evolved. Zhao Qingchao and Huo Qiaolian noted that adaptations thrived in the 1980s, predominantly utilizing fixed camera shots. Most camera movements were limited to slow pushes, pulls, tilts, pans, and tracking shots, generally maintaining an objective viewpoint. The works from this period emphasized symmetrical and aesthetically pleasing compositions with bright and clear overall color tones. When portraying spirits and supernatural beings, the productions relied on reducing lighting and adding sound effects to achieve a sense of horror, enriching the characters' external appearances and internal emotions. Montage techniques were used to express Romantic sentiments, prioritizing the expression of human nature over supernatural appearances, conveying a profound and substantial aesthetic sense [8]. In the 1990s, the works became more diverse in terms of camera setups and visual compositions. The pacing of the narratives accelerated, incorporating fast- moving shots and cutting-edge editing techniques. The films presented solemn and elegant classical styles through multiple angles, modern styles with tilted and oppressive compositions, and postmodern imagery with fragmented combinations, creating a mix of styles that aligned with global cinema trends, fostering open and innovative creative thinking. Since the new millennium, co-produced films have been popular. Mainland directors (like those of Painted Skin 2) heavily incorporated production techniques

and aesthetic symbols from Hong Kong, Taiwan, and overseas films. Directors from Hong Kong, Taiwan, and abroad, like those of Painted Skin and The New Chinese Ghost Story, have also contributed [9]. Realistic visual effects in these productions depended on sophisticated post-production techniques [10]. Using RGB digital compositing technology, actors could be seamlessly integrated with backgrounds, providing audiences with a realistic and fantastical viewing experience [11]. However, these technologies were still insufficient to fully express the complex and diverse elements of Liaozhai and meet the aesthetic preferences of modern audiences. The films Painted Skin and Painted Skin 2 were successful in narrative and box office terms, with Painted Skin 2 making significant efforts in constructing fictional worlds and investing heavily in the fantastical quality, introducing "concept design" to Chinese cinema for the first time. The Painted Wall and The White Fox were successful in constructing fictional worlds. The New Chinese Ghost Story attempted to adapt classic legends using extensive digital technology to depict Eastern mythology. "The film's 1200+ CG shots were produced by the South Korean company 2L", as shown in Figure 1, successfully exploring collaboration with international teams [7].

Figure 1. The New Chinese Ghost Story (2011) CG screenshot

For over forty years, the film and television adaptations of Strange Tales from a Chinese Studio have undergone a convoluted process and achieved certain successes and breakthroughs. However, with further liberalization of the cultural context and the strong entry of Western Hollywood-style blockbuster effects, audiences' expectations for mythological themes in film and television extend beyond just plotlines; they now also anticipate new narrative structures and advanced production techniques. Recognizing the portrayal of unique forms and spectacular scenes in mythological stories has a profound and positive impact on promoting traditional culture [12].

2.1.3 Design Reference

This paper selects the story Lu Pan from Strange Tales from a Chinese Studio, specifically from the fifth section of Volume II, written during the Qing Dynasty by Pu Songling. It details the friendship between Zhu Erdan and Lu Pan. Zhu Erdan, who is somewhat slow-witted, is coaxed by people to carry the feared Lu Pan on his back, an act that unexpectedly brings revolutionary changes to his life. After becoming good friends, they often gathered together. Lu Pan, known for his generosity with alcohol and extraordinary conversation, noticed that Zhu Erdan's mind was blocked and he was poor at writing essays. So, he selected a fine heart for him, which indeed won him two first prizes. Disheartened by his career, Zhu Erdan asked the judge to request a beautiful head for his wife. Without hesitation, Lu Pan found an opportunity and replaced Zhu Erdan's wife's head with that of a beautiful woman, the daughter of Wu Shiyu, who had been harmed by thieves. Due to this change, Zhu Erdan and his family became in-laws with Wu. After his death, Zhu Erdan served as an official in the underworld and often visited his home to educate his son. He later gifted his son a saber, advising him to be a good official and to pass the saber down through generations. This paper chooses to adapt the plot of Lu Pan replacing Zhu's wife's head [13, 14].

The biggest production challenge in this scene is the head replacement of Mrs. Zhu. This article references past works and related segments from other works, analyzes their presentation styles, advantages, and disadvantages, and proposes an improved plan using the Unreal Engine for production.

Table 1 shows the Head-Swapping Episode of Lu Pan from film and television. From the 1987 Version of Liaozhai, the head follows the movement of the judge's pen, panning out of the frame. The film is quite old, and these special effects were well-received at the time, clearly and directly showcasing the head replacement. However, the visual impact is not strong enough. If it could show some details of the head, such as the broken blood vessels in the neck, this might require a more detailed model. The 2005 Version of Liaozhai, after filming the material, a red cross-section was post-produced. Some special effects lights were used when the judge beheads. The actual head replacement was achieved through live-action silhouettes. The visuals are roughand poorly crafted, with the head cross-section being particularly unrefined. The filming techniques were used to avoid the use of special effects. The TVB Version of Strange Tales of Liaozhai: The Legend of Lu Pan and Zhu Er Dan, entirely live-action. A prop head substitutes for a human head. The process is avoided, and the film directly shows the back of the female lead after the head replacement, then uses a subjective perspective to display the surprise of others, indirectly conveying the process of head replacement. The film is from an even older era. Although it can narrate the story, it fails to highlight key visuals and lacks visual impact. From other reference (The Investiture of the Gods with Shen Gongbao's flying head), The production team first previewed the effects through modeling and camera positioning. In pursuit of a natural look for the head, they chose to shoot live action, but not in real-time. Real-time effects [15]. The head effect, whether using props or composites, may not be as realistic as live action, but this work still does not display the details of the head. The connection at the neck is replaced with green smoke effects, and it does not break free from the limitations of live action [16].

Table 1. Film and Television Adaptations of the Head-Swapping Episode of Lu Pan

Name	Screenshot(s)	Head Replacement Method	Camera Movement
The 1987 version of LiaoZhai		Special Effects Composition	Fixed shots
The 2005 Version of Liaozhai	 	Live Action	Fixed shots
The TVB Version of Strange Tales of Liaozhai: The Legend of Lu Pan and Zhu Er Dan	 	Live Action	Fixed shots (completely avoids the process)
Other reference (Movie The Investiture of the Gods with Shen Gongbao's flying head)		Special Effects Composition	Tracking

Overall, in addressing the challenges of mythological adaptations, the Unreal Engine can optimize scenes, model details, lighting, camera movement, rendering quality, motion capture, and editing.

2.2 Summary

Digital technology and mythological theme films complement each other. Digital technology has driven the development and maturation of mythological films, and the extensive filming of mythological themes has similarly fostered the birth of digital technologies. By analyzing the outstanding performance of the Unreal Engine in virtual photography, animation production, special effects, color and lighting, and real-time rendering, combined with the rich cultural foundation, the complicated development trajectory, and specific works of mythological themes exemplified by Strange Tales from a Chinese Studio, it is evident that mythological theme films lack in shooting techniques and production technology. Some works have not kept up with international standards in producing visual effects, needing improvements in the realism and refinement of special effects. The production of special models, such as ghosts and mythical creatures, mentioned in mythological themes, is not sophisticated, relying on actors' appearances and makeup, failing to fully convey the shock brought by visual effects. Some works might lack innovative cinematography techniques and artistic expressiveness with monotonous camera setups, not fully utilizing modern photographic techniques such as long takes or deep focus to enhance narrative and emotional expression. In scene design, some works may overly rely on green screen technology, resulting in a lack of realism and immersion, failing to effectively recreate the environmental ambiance of Liaozhai stories. Post-production is a crucial phase for enhancing the quality of film and television works, and some works might have rough issues in editing, color grading, and sound effects, affecting the overall visual and auditory experience. Technically, some production teams may not effectively integrate technical methods with artistic creation, leading to unclear purposes of technology serving art, impacting the overall quality of the works [17]. Facing the urgent problems in the creation of mythological theme films and television, the Unreal Engine offers a valuable solution. Utilizing the powerful capabilities and the "what you see is what you get" film industry process of the Unreal Engine, it further optimizes the strategy for mythological theme adaptations, eliminating uncertainties in traditional production processes. Based on the powerful capabilities of the Unreal Engine, it provides strong technical support for presenting fantastic scenes and supernatural beings in mythological stories. Its virtual photography can enrich camera design, and its high-precision rendering capabilities can display detailed images, enhancing the realism of visual effects. The application of the Unreal Engine's real-time rendering capabilities and compatibility with other software can significantly improve team collaboration, increase production efficiency, shorten production cycles, and greatly reduce the production costs of high-quality adaptations of mythological theme films and television works [18].

3 Experiments

3.1 Process Design

The process design consists of three main parts: Preproduction, Post production, and Post production.Preproduction includes the production process from the story to the split-screen script.Post production includes the process of production in Unreal Engine and collaboration with other software.Post production includes all the post-production needed for the project. Production includes compositing, editing, colour grading, and special effects needed for the project as shown in Figure 2.

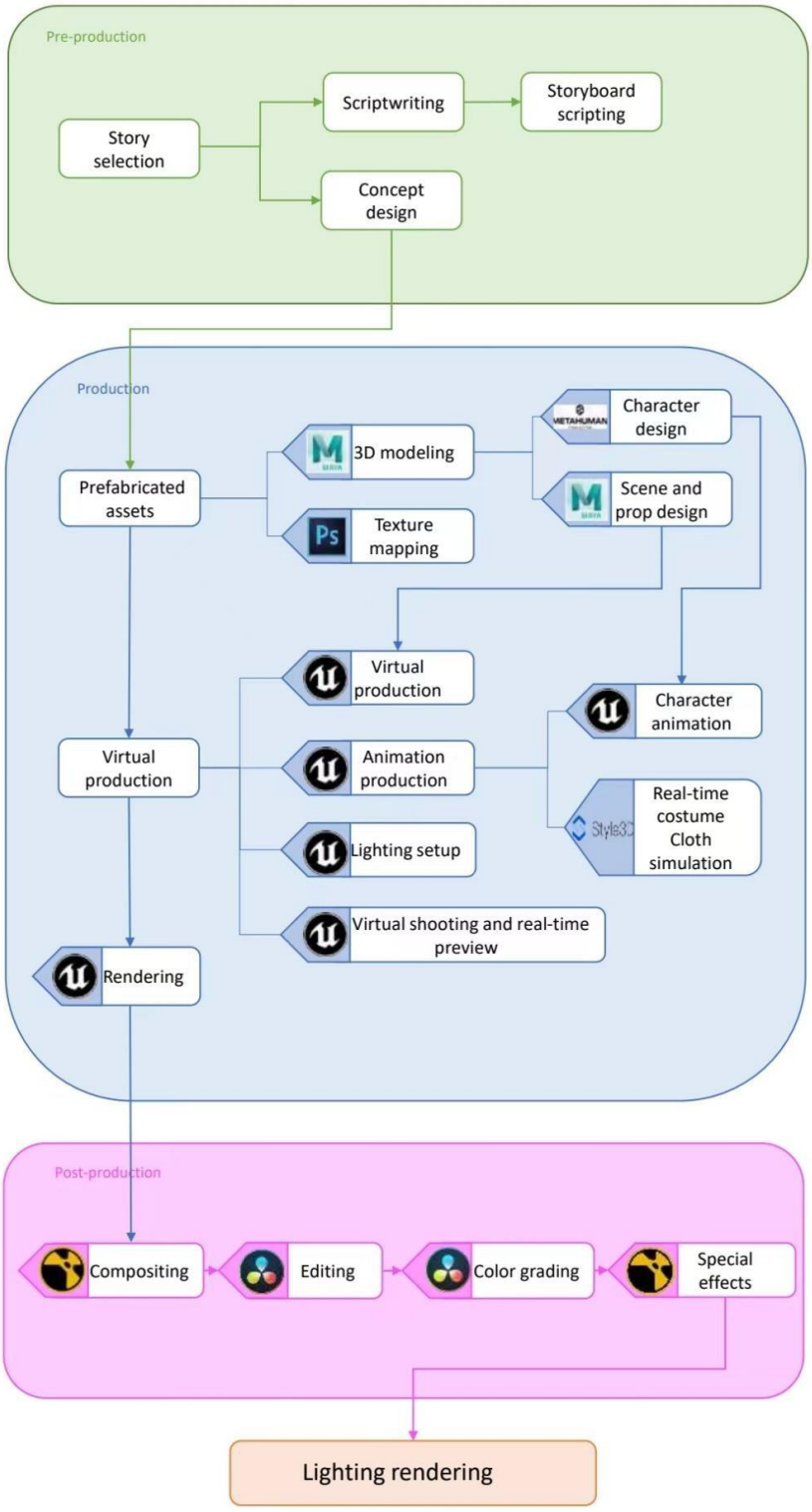

Figure 2. Process design and software collaboration diagrams

3.2 Pre-production

3.2.1 Story Selection and Script Writing

Choose a suitable Liaozhai story for film adaptation and convert it into a screenplay. This paper selects the story of Lu Pan from Strange Tales from a Chinese Studio. Based on the original text, where Zhu Erdan leads Lu to the bedroom to see his wife sleeping on her side. Lu gives Zhu a head to hold; then, taking a dagger from his boot, he presses it against the wife's neck and cuts as if slicing through decay, the head falling beside the pillow; he quickly takes a beautiful woman's head from his bosom and fits it to the neck, inspecting it for proper alignment, then pressing down. After adjusting the pillow to fit the shoulders, he instructs Zhu to bury the original head quietly, then leaves. This scene of Mrs. Zhu's head being replaced is extracted and adapted into the screenplay for production.

Pre-production: During the early preparation of the project, after selecting the original story, adapt it into a literary script and create a storyboard script. At the same time, perform concept designs for the scenes and character images in the project.

Production: During the production process, first use software such as Maya, Photoshop, and Metahuman to create the scenes, character models, and textures required for the project. Then import these assets along with clothing assets created in Style3D into Unreal Engine for scene construction and animation production, set up lighting according to the design, and output through preview rendering.

Pos-production: Composite the high-quality rendered sequences using software like Nuke and DaVinci Resolve for post-production and output the final results.

Int zhuerdan's Bedroom Night

The bedroom of the zhuerdan residence is silent and still. Mrs. zhu, with disheveled hair and dressed in nightclothes, lies on the bed. A beautiful head slowly rises beside the bed, causing Mrs. zhu to stiffen in fear and sit up abruptly.

3.2.2 Concept Design

This scene represents the climax of the story and needs to create a terrifying and eerie atmosphere. The setting is Zhu Erdan's bedroom, and the character involved is Mrs. Zhu. A prop of the beautiful woman's head needs to be created.

3.3 Process

3.3.1 3D Model Production

Characters: Character models are created by generating material boxes in Unreal Engine from the actors' real photos. Unreal Engine processes the actor's photos to create a head model that resembles the actor. This model is then imported into the Metahuman website using the Bridge plugin, where adjustments are made to the head model as well as to the skin texture, hair, and body shape. Afterwards, the model is imported back into Unreal Engine via the Bridge plugin for further production as shown in Figure 3.

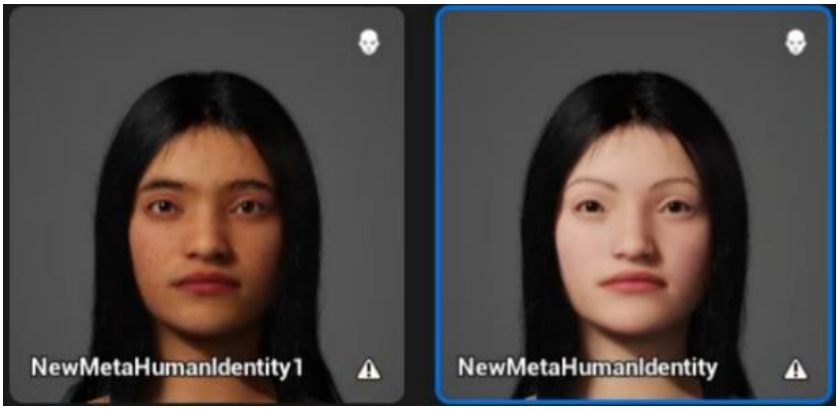

Figure 3. Makeup before and after comparison

Unreal Engine supports exporting this model and its materials in the FBX format, which is a common format compatible with most 3D software. This allows for further refinement and detailed sculpting in software like Maya or Blender. In this case, the head model is imported into Maya, where detailed modeling and sculpting of the blood vessels at the neck's severed area are performed to enhance realism and create a more lifelike appearance of the cut. This detailed attention ensures that the visual effects are convincing, contributing significantly to the eerie and horrifying atmosphere of the scene as shown in Figure 4.

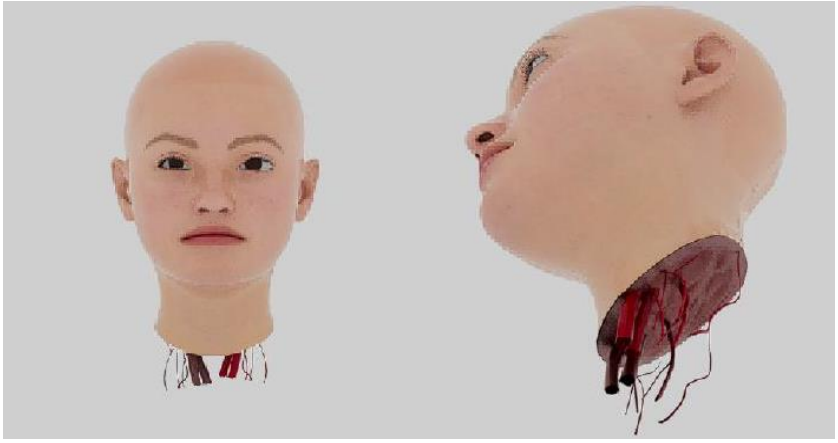

Figure 4. Character head design

The required scenes according to the story are either modeled from scratch or pre-existing FBX format models are downloaded and then imported into Unreal Engine levels for adjustments. This method allows for rapid assembly and modification to fit the narrative needs.

3.3.2 Materials and Texture Mapping

Based on the specific models, appropriate textures are painted or alternatively, materials can be downloaded from the Unreal Marketplace. The Unreal Marketplace offers a wide range of high-quality material resources provided by digital artists from around the world, meeting most production needs. These resources can be utilized to enhance the visual quality and detail of the scenes, ensuring that they align closely with the artistic

vision and thematic requirements of the film as shown in Figure 5.

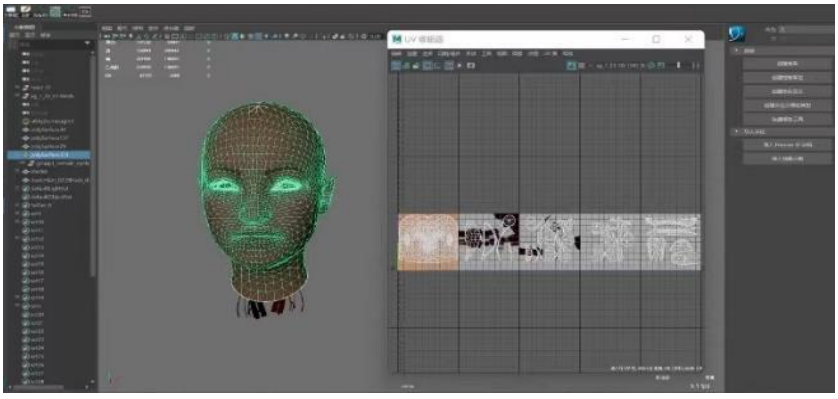

Figure 5. Multi-quadrant texture mapping production

3.3.3 Virtual production

Unreal Engine features various types of light sources that can be strategically placed within the scene to create suitable lighting effects. Additionally, Unreal Engine's realistic skylight and weather system can be used to simulate natural environmental settings. In this particular scene, light sources are inserted into lamp models to create an atmosphere that aligns with the narrative requirements. The Unreal Engine's camera offers the flexibility to frame shots with the appropriate focal length and shot size. Tools such as jibs and sliders can also be set up within the scene, significantly compensating for the limitations of low-budget productions by enabling dynamic and cinematic camera movements.

In Unreal Engine, virtual characters are rigged with skeletons which can also be modified using Unreal Engine's built-in skeletal system. On the Mixamo website, select suitable motion animation data from the database (motion capture can also be conducted), and import these into Unreal Engine as shown in Figure 6. The skeleton of the character in Unreal Engine can then be retargeted according to the character's motion effects to ensure seamless integration of the character movements with the animations. This process allows for creating highly realistic and precise character animations that enhance the storytelling and visual engagement of the scene.

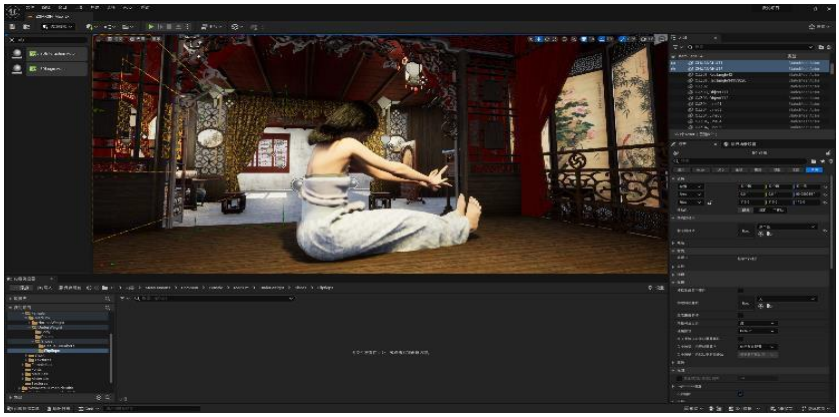

Figure 6. Character animation

Import the Metahuman character model into Style3D software to create clothing that matches the story setting as shown in Figure 7. Style3D contains a vast array of digital clothing resources provided by numerous clothing design artists, which can be used as references. Additionally, Style3D can perform real-time fabric simulations within the software. The completed clothing assets are then imported into Unreal Engine, aligning with the character animations. During this process, the real-time fabric simulation can be activated to adjust and fix issues such as mismatches and clipping in the clothing [19].

During the production process, it is possible to immediately view the rendering effects of the Unreal Engine, allowing for on-site adjustments.

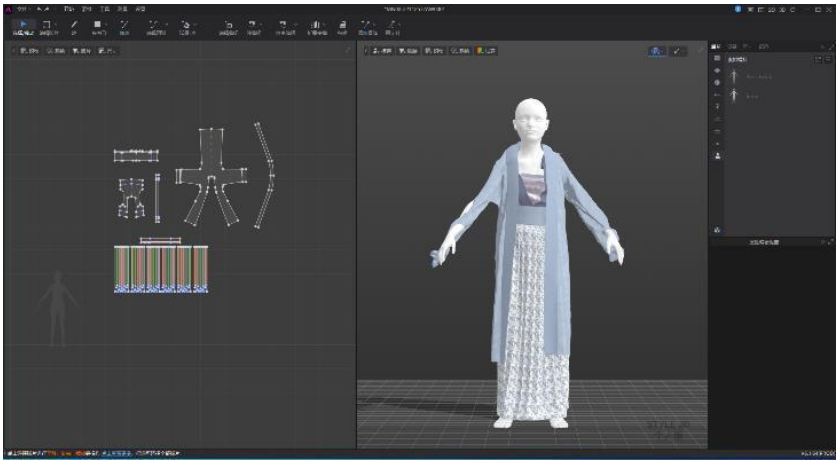

Figure 7. Style3D real-time cloth rendering process

Utilize virtual photography settings and features to adjust the camera angles and movements, simulating the motion of real cameras.

Render the final sequences at high quality and then import them into other software for video compositing as shown in Figure 8.

Figure 8. Rendering effect display

3.4 Post-Production

To add to the mythology of the shot, add halo effects.Composite the rendered sequences in Nuke. After color grading and editing, proceed with further special effects production to output the final results as shown in Figure 9.

Figure 9. Final composite effect

3.5 Summary

Based on the production process of the head-swapping scene in the "Lu Pan" story, Unreal Engine has played a positive role in the visualization of mythological stories, significantly enhancing production efficiency. Real-time rendering makes the production process smoother and more flexible, allowing creators to freely adjust and experiment with different creative solutions as required by the plot, thereby enhancing the innovation of the work. Additionally, the use of Unreal Engine can reduce traditional production costs and break the constraints of traditional sets. The simplification of processes by Unreal Engine even allows colleges to achieve effective creative production, aiding in cultivating students' digital media skills and innovative thinking. Students can enhance their abilities in 3D modeling, animation production, visual effects, and game design by learning to operate Unreal Engine. The openness of Unreal Engine allows students to transform their creativity into practical projects, enhancing their practical experience and problem-solving skills. However, real-time fabric simulation and real- time rendering require high hardware specifications. There are many

plugins available for Unreal Engine, but not all are perfectly compatible, requiring continual adjustments and optimization, and many plugin features are paid. Unreal Engine's real-time rendering can produce stunning effects, but sometimes there are differences from the final rendering results. Also, using resources in Unreal Engine involves copyright issues, and care must be taken regarding copyright when using third-party resources.

4. Conclusion

This paper uses the digital image adaptation of the Strange Tales from a Chinese Studio story as a case study, discussing the feasibility and pros and cons of using Unreal Engine for the film adaptation of mythological themes. It specifically analyzes the powerful technological advantages and limitations of Unreal Engine, the development process of mythological theme film adaptations, and the specific functions of Unreal Engine and the deficiencies in Liaozhai film adaptations. Through case production, a set of production processes was derived to compensate for the shortcomings in the visual presentation of Liaozhai. Unreal Engine can give new vitality to mythological themes, presenting the strange worlds of the text in realistic and vivid imagery before the audience. Based on the powerful capabilities of Unreal Engine, strategies for the film adaptation of mythological themes are also enriched.

Although the use of Unreal Engine demands high hardware and technical requirements, this paper in its case production only selected a single shot for production, which has certain limitations. However, we can still continue to deeply research Unreal Engine based on this trial and further explore its creative role in Liaozhai film adaptations.

The future prospects for the film adaptation of mythological themes are promising. Despite the long and challenging path ahead for film production teams, by persevering and keeping abreast of cultural and technological developments, taking on the responsibility of inheriting and disseminating national culture, and carrying the burden of cultural innovation, mythological theme films can potentially become classic works in the future.

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