



Design and Realization of Seasonal Experience Animation of Suzhou Garden 3D Landscape

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Abstract. The increasing maturation of digital technology has facilitated the protection and promotion of a growing number of Chinese intangible cultural heritage sites through digital media. Digital three-dimensional scene technology has reached a high level of maturity, yet most available scene animations display only the seasonal scenery in a continuous cycle, resulting in a lack of novelty in the sensory experience. This project aims to digitally recreate Suzhou Garden using an engaging and modern approach. A 3D scene model will be constructed and presented as a cyclical animation, featuring seasonal and weather changes to enhance the immersive experience. This allows users to select their preferred cyclic animation of the Garden of Suzhou, featuring different weather scenarios across all four seasons. This design deviates from the traditional scene construction that employs very specific style effects. Instead, it uses a more flat animation style to construct scenes. To visually represent the three-dimensional aspects of Suzhou Garden using circular animation, while also spreading awareness of non-heritage ancient architecture and creating a new mode of expression through the fusion of digital art and traditional culture in the modern era. Additionally, this aims to facilitate an intergenerational exchange between contemporary and traditional values.

Keywords: Suzhou Garden, Looped animation, 3D modeling.

1 Introduction

1.1 Research background

There is a longstanding Chinese proverb that states "Above there is heaven, below there is Suzhou and Hangzhou." Suzhou Garden, which represents the pinnacle of Chinese traditional garden landscape design, is an intangible cultural heritage site of Jiangsu Province. It displays the exceptional character of Chinese traditional culture and showcases the design ingenuity and cultural legacy of our ancestors.

The Suzhou Garden serves as a significant material entity in portraying the development of China's ancient history and culture. Currently, the continuous evolution of dig-

ital technology is leading to the digitisation of conventional techniques used in protecting garden architecture, thereby achieving the status of living heritage [1]. The promotion of ancient architecture through science and technology is currently the prevalent approach. Digital technology has gradually emerged as a crucial tool for transforming tourism enterprises [2]. To attract more visitors to the garden, continuous experimentation is vital [3]. Thus, examining modern digital representations of Suzhou Garden in the context of China's digital development is imperative.

1.2 Research purpose

As a developing nation, it is imperative that we maintain our cultural self-confidence [4]. We should promote and publicize our traditional culture while flexibly incorporating mainstream emerging media and contemporary design styles of the new era to recreate gardens. Furthermore, we need to retain the essence of traditional Chinese gardens and blend our cultural heritage with new innovative forms and styles to appeal to modern young people. This approach will enable us to generate more novelty and avant-garde beauty within our traditional culture. For instance, the country has recently started to create Hmong non-heritage culture through three-dimensional animation dissemination. It remains to be seen whether this form of dissemination can also be applied to garden creation [5].

Currently, most three-dimensional garden landscape modelling on the market aims for a realistic effect, but there is still a substantial discrepancy between the realistic effect presented on a display screen and the corresponding scene in real life. As part of the production process for this design, we aim for a youthful architectural model design style, utilizing a three-dimensional animation approach preferred by young people. The light and shadow effects should resemble those of reality, delivering a visually stimulating experience [6]. Enhancements include the addition of modern, metallic materials to the object surface, evoking a sense of technology innovation. Secondly, this design merges the static 3D model with video because, on a global scale, watching short videos has become an integral aspect of everyday life. The internet age has brought people, people and things, and things and things, even closer together. To promote the legacy of traditional culture, it is necessary to blend it with contemporary mainstream media creation [7].

2 Design process

2.1 Three-dimensional scene construction

The architecture and composition of Suzhou Garden were analyzed during the design phase, with multiple sketches and iterations created in order to combine the garden's scenery with its distinctive Chinese and classical influences. Ultimately, a new section of Suzhou Garden was produced through this process.

While preserving the garden's characteristics, we enhanced and rearranged certain scenes to create a complete final image. When constructing the scene with Cinema 4D

software, we prioritize the scenery's proportions and the environment's realism to ensure accuracy. The image's final rendering blends fully realistic and fully cartoon styles, with a slight bias towards 3D cartoon animation. Additionally, the architectural style of modelling form in scene construction references the popular multiplayer network game market, in an effort to attract a younger audience. For instance, in Figure 1, the corners of the garden building model have been rounded rather than angular to create a softer visual effect. The materials and lighting have been chosen to maintain realism, while the surface texture and details of the object have been reduced.



Fig. 1. Spring and Winter Modeling

Secondly, the design incorporates dramatic changes by placing four scenes inside a transparent glass sphere. This is intended to demarcate the hidden boundaries of the garden corner that are fixed within this confined area, enabling easier production of subsequent animations.

The overall image depicts a large high-purity material surface with colour effects. The real texture details have been removed, leaving only the object's structure. A portion of the material uses a technology-inspired metal finish, enhancing the feeling of modern science and technology. This connection between the past, present, and future is highlighted. The interior of the glass sphere enhances the spectacle of objects descending through the air in line with the varying seasons. For instance, in Figure 2, during spring, the petals of falling flowers evoke the season's essence, while the downfall of green leaves in summer imbues a sensation of lushness. In autumn, the descent of golden yellow leaves creates striking visuals, and winter's snowflakes bring a sense of coldness and melancholy. Various surroundings lead to diverse visual experiences that affect the human brain. Through visual feedback, the five senses are capable of detecting the season's temperature, identifying smells, and achieving a sense of immersion, thus enhancing the enjoyment of an individual shot.



Fig. 2. Demonstration of the falling effect of the special falling objects of the four seasons

2.2 Looped animation

The design is exemplified by a 3D scene loop animation, wherein space and time are transformed, and lens language and continuity are utilised to express a language of animation loops [8]. After constructing the three-dimensional scene model architecture using Cinema 4D software animation production system, four seasons scenes were arranged in the order of spring, summer, autumn, and winter loop. The shooting method of a pull lens was used to change the perspective of the scene lens. The video begins with the spring scene, followed by the summer scene, and so on. The four seasons then repeat, and the cyclic animation of video clips was processed using Adobe Premiere software.

Two cyclic animation videos were exported for sunny and cloudy weather conditions, providing users with a novel visual experience. Compared to pictures and text, video has a faster communication ability and can enhance users' memory of the image. Incorporating circular animation to the static 3D model will aid users in comprehending and retaining the landscape of Suzhou Garden more efficiently, as well as experiencing the delight of various imagery [9].

The fusion of static and dynamic loop animation can enhance the design of dynamic ornamentation. It can display the scenery of the four seasons within a short period of time, allowing the audience to selectively view different times of the garden scenery and participate actively. This promotes objectivity and comprehensibility while maintaining a conventional structure and clear, objective language.

2.3 Design innovations

The garden display design of today fails to attract young users to stay and watch due to its lack of balance between reality and the virtual world. It is important to avoid oversimplifying scientific concepts or sacrificing aesthetics for scientific accuracy. The design should aim to integrate science and design seamlessly, rather than prioritising one over the other. This design integrates the two using a novel approach. It presents a static three-dimensional garden landscape through cyclic animation across time and space. The viewer can observe different garden scenery in various seasons and lighting conditions through the cyclic animation.

The combination of 3D modelling and circular animation enhances the immersive experience for the audience and increases their engagement compared to static images.

This results in a more dynamic and vivid design. By combining static and dynamic forms of expression, the design can present a more comprehensive view. The audience can freely explore different scenery in the virtual space and experience the dynamic and colourful cycle of animation. The aim of this design is to expand the Suzhou Garden's audience by utilising flat animation style videos as a means of communication. This method deviates from the traditional use of realistic three-dimensional models of the garden.

The video provides a simplified depiction of the garden and showcases the dynamic, seasonal changes, including shifts in weather from sunny to overcast conditions. With

the rise of short videos as the primary visual aid in media, it is changing the conventional approach of communication and emotional sharing and transforming the narrative and communication of media memory construction [10]. The still-life depiction of Suzhou Garden in tourism or daily life is now brought to life in the virtual electronic world, creating a dynamic and fascinating novelty that can alter the timeline of moving images. The new mode of connectivity has the potential to establish a new digital civilisation and create a novel global communication paradigm.

Additionally, the image presentation is not the conventional realistic three-dimensional modelling of a garden. Rather, it is skewed towards a youthful, animated style that is also suitable and appealing to the middle-aged and elderly user demographic. The benefit of this design is that it can be disseminated more widely for comparative purposes. The style is not heavily polarised towards a love or hate stance. The modelling includes exaggerated production, but serves the purpose of highlighting the characteristics of the style, making it easier to identify and increasing its dramatic impact.

The material chosen deviates from the usual real material, with some object surface materials reflecting brighter metallic materials. A traditional architectural style has been enhanced by the addition of technology-sourced materials, combining new and old to lend the picture a different vitality.

The design utilises a combination of 3D modelling and circular animation to create a dynamic experience that fully immerses the audience in a virtual space, allowing them to view the real world in a realistic setting. This design serves as a bridge between the two, promoting interoperability.

3 Conclusions

As of September 2023, China boasts 57 entries on the World Heritage List, encompassing 39 cultural properties, 4 mixed sites, and 14 natural wonders. It holds the top spot among all countries on the list. Each of these sites is a luminous gem in China, with great significance for the promotion and perpetuation of its rich cultural heritage. This presentation features the Suzhou Garden in a novel way via 3D model cycle animation.

The addition of two sets of weather changes for the different seasons enhances both its attractiveness and interest. This approach also represents an innovative expression of traditional garden artwork, making it easier for the media to disseminate and memorise in the contemporary social landscape.

The main issue to be addressed in this design is determining the most effective method for disseminating the garden culture. Additionally, the designers must examine how to generate more interest among younger users in traditional culture, while also expanding publicity. They can achieve a better outcome by incorporating people's preferences from daily life into the design.

Therefore, designers should consider how to better promote their designs. The primary objective of designers is to promote Chinese cultural confidence while designing, with the aim of increasing the output of traditional Chinese culture. This objective aims to assist more individuals in comprehending and becoming intrigued by the garden, thereby enhancing the garden's preservation.

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