Creation Techniques of Perspective Effect Drawing of Garden Landscape Based on CAD Technology

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Abstract: Planning and design of garden landscape is a combination of art and technology. The artistry of garden landscape requires the support of garden knowledge and technology. The creativity of garden landscape requires artistic methods to present. The comprehensive use of art and technology makes the landscape intention of garden landscape designers and the design idea is perfectly reflected. With the continuous development of computer digital media technology, garden landscape planning and design have gradually improved the traditional production methods. By combining garden landscape planning and design with computer digital media technology, garden landscape planning designers use computers to complete floor plans, The production of three-dimensional landscape renderings, etc., has greatly improved the speed at which designers complete their works. This article mainly studies the technique of creating perspective effect drawing of garden landscape based on CAD technology. From the statistical analysis of this article, we can see that the scale of the garden market is gradually expanding with a growth rate of 6.93%. The garden landscape market is a huge development trend. Studying the techniques of creating landscape perspective renderings will play a significant role in future development. The perspective effect drawing of the garden landscape is an ideal way to express the design of the garden landscape, allowing the designer to intuitively ponder and deepen the understanding of the design concept, and improve the communication efficiency and effect.

Key words: CAD Technology, Garden Landscape, Perspective Creation Technique, Technique Research, Landscape Planning and Design

1. INTRODUCTION

Since the 21st century, China's rapid development of science and technology has driven the economy to change with each passing day, and people's living standards have continued to improve. Under the condition of material satisfaction, people began to pursue spiritual life, pay attention to the quality of life, enjoy the release of the senses, and developed great enthusiasm for tourism. Accompanying this hot wind is that garden landscapes have received more and more attention, and the design requirements for garden landscapes have become higher and higher [20]. Traditional

garden design techniques can't meet the design and sensory requirements of garden landscape. Therefore, in response to the call of the times, the use of modern scientific and technological means, combining computer technology with garden landscape design, has brought the gospel to the garden landscape and given new hope[2]. This article mainly researches on the creation techniques of perspective effect drawing of garden landscape based on CAD technology.

Graham Fairclough offers a cultural landscape perspective from a European perspective and a background of archaeologists based on heritage practices. The British historical landscape characterization approach and the CHeriScape network's approach to studying synergies between landscape and heritage illustrate this view. He believes that landscape can help society to meet major global challenges, such as climate change, various forms of globalization and social change, in order to develop in a more culturally sensitive and sustainable direction [6]. *Luo Y* believes that landscape architecture is an evidence-based profession and discipline in which reliable evidence is used to guide future designs. To promote sustainable design practices, scientific evidence is needed to support the design and to demonstrate performance. The Landscape Performance Foundation's Landscape Performance Series (LPS) is one of the efforts to gather this evidence. LPS is based on the sustainable development triad, and aims to quantify the results of applying landscape solutions in environmental, economic and social aspects through the collaboration of researchers and practitioners. Landscape performance research is still in its infancy. There are many gaps in its indicators and methods [18]. Many scholars acknowledge the need for rigorous research in landscape design to improve practice and teaching, and recent research has explored research trends in the discipline. This research continues this exploration by reviewing articles published in three major English landscape architecture journals: Landscape Journal, Landscape Review, and Landscape Architecture Journal. The *Cushing D F* study analyzed abstracts of 441 research papers to identify specific topics and publishing trends over 31 years. His findings show that "history" is by far the most prominent research theme, followed by "social and cultural processes and issues" and "aesthetics". Several topics, such as "Sustainability and Green Infrastructure", "Participation and Cooperation" and "Research Methods and Methodologies"-have become more prominent in recent years. However, current social and political themes (such as "climate change", "active life", "energy" and "health") have not yet become prominent themes in the research literature and may be key areas for future contributions [7]. *Restrepo LF* has studied the relationship between landscape beauty and ecological beauty is an important scientific issue, which reflects the nature of human-land relationship, and the current academic research on this topic is mostly based on a single point of view. He took a certain scenic area as a typical urban traditional cultural tourist destination, and adopted the landscape pattern index and the balanced and incomplete block comparative evaluation method as the evaluation criteria of ecological beauty and landscape beauty [21].

This article explains the process of using the CAD series software to create perspective renderings of garden landscapes in this project, and solves the problem that medium and small garden landscape planning and design cannot afford high geological exploration costs. In this paper, we use GPS equipment to obtain geographic coordinates, and then use Google earth software and Google Sketch Up software to obtain geographic models. Then import it into AutoCAD and Autodesk3DsMAX software to create small and medium-sized garden landscape perspective effect creation. In this paper, by cleverly using software technology and aesthetic "perspective principle", it avoids the technical difficulties that require large servers as hardware support in large 3D renderings scenes, and successfully breaks through the difficulties of small and medium-sized garden landscape planning and design.

In this article, the following problems are mainly solved: the geographic coordinate data format read by GPS is not compatible with Google Earth software; the processing of vision and vegetation in the 3D rendering; the processing of perspective relations in the 3D rendering; 3D effect Water treatment in the picture.

2. PROPOSED METHOD

2.1 The Meaning and Role of Computer Renderings

(1) The meaning of computer renderings of garden landscape design

Computer renderings in garden design are designed by the landscape architect through specific requirements, such as overall style, functional characteristics, etc., and then based on the engineering drawing, the design concept of the garden landscape is more intuitive and visualized through computer technology. A way to show it [1]. The effect of the computer landscape design of the garden landscape is three-dimensional, which can clearly reproduce the designed garden landscape, such as space form, color tone, lighting effect, angle view, etc., and is convenient The designers checked and modified and finally achieved the ideal effect in the designer's mind [19][22].

(2) The role of computer renderings in garden landscape design

First of all, the use of computer renderings technology can cultivate and improve the design abilities of designers, which is beneficial to designers' intuitive understanding and development of design thinking. Making computer renderings of garden landscape design requires designers to have a certain space design ability and expression ability, because the renderings can visually represent the designer's design works [5][11]. Secondly, it can help designers show their works perfectly, which is conducive to communicating with customers and timely feedback. With the improvement of people's living standards and the enrichment of material culture, the demand for spiritual life is expanding. The performance is that people have their own views on the design of garden landscapes, actively participate in local or known garden landscape design, communicate with designers, and put forward their own opinions and views [8][9].

2.2 Creative Techniques

In the perspective renderings, in addition to the bird's-eye view, most of them show some aspects of landscape elements such as terrain, stone setting, mountain construction, water plants, buildings, structures, lighting, and colors from a certain perspective. Take the PS to deal with the overall layout, subject background, etc. as an example, to explain the creative techniques of modern garden landscape perspective renderings [14].

(1) Overall layout

The overall layout of the perspective renderings refers to the color mix in the scene, the placement of various shapes, and changes in form. From the perspective of composition, the scene is required to give people a sense of harmony and balance. It is not appropriate to use too strong contrasting colors, to avoid visual jumps, and to ignore the main landscape. Color matching should be based on the solar terms and time to be reflected in the scene. The overall layout must be reasonable, neither can make a part too crowded, too prominent, or make a certain part appear spacey; on the basis of grasping the main landscape elements, you can add forest pictures as the main environmental background and introduce grasslands. Adjust the perspective relationship of the scene.

(2) Subject background

Generally, the sky picture, trees or auxiliary buildings are used. Pay attention to the following points during processing. :

The first is that the color atmosphere of the sky should match the main landscape and conform to the effect of the overall picture. The main subject landscape with a more vivid and complex shape should have a simple and calm background sky, less clouds, and even a blue halo; the simple and clean main landscape, coupled with rich sky, can add an active atmosphere to the picture. The second is to deal with the same work, using the morning sky and using the evening sky will produce different effects. This item should be considered in 3D lighting, and clearly define the weather factors of the scene, such as season and time, sunny and cloudy. The third is to set auxiliary materials such as auxiliary buildings or woods when setting the sky background, so as to accurately create a real

environment atmosphere [12][13]. Using the sky in the same scene as adding the woods as the main background has different effects. When using the sky as the main background, the entire picture looks empty, and the ground is connected to the sky. This kind of picture looks very full. After adding the woods, it does not block the view On the contrary, the sight of the person gives a sense of depth of field, which is the charm of the scenery material [17][18]. The fourth is to deal with modern buildings and properly apply auxiliary buildings, which can easily simulate the layered sense between buildings and streets in real life.

(3) Water body

In the multi-dimensional field, the performance of water has always been a difficult problem for creators. Water in nature looks authentic and spiritual, for the following reasons: First, the uneven texture of water is a kind of spine. In 3D, the noise is usually modified by applying noise deformation to achieve the effect. In PS, the effect can be simulated by distorting the filter [10][15]. Second, the image on the water surface is the result of reflecting other things. Everyone who learns landscape painting knows that the effective method of painting water is to draw the reflections of mountains and trees around the water body on the water surface according to the principle of light reflection. The water is similar to natural water [16]. Use the PS adjustment layer to achieve the natural effect of the water body. Use the move tool to drag the water body material to the desired position, and use Ctrl + T to adjust the size of the water body. At this time, pay attention to holding Shift for proportional scaling. The saturation (Sutration) is always: -43, In order to enhance the ripple effect on the water surface, you can adjust the contrast. In order to better express the main scene water effect, you can use vertical flip (Filp Vertical), and change the blending mode of the flip main scene layer to Softlight, using ripple (Ripple) filter can enhance the effect of refraction projection [4].

3. EXPERIMENTS

3.1 Technical Realization Steps

(1) Analysis and modeling of building site

As shown in Figure 1, it is the specific steps to realize the technique. The establishment of the model of the computer landscape rendering of the landscape is a crucial step, but before this, we need to conduct an overall analysis of the site where the garden is established. The main body of the design must also understand and analyze the surrounding environment, terrain and other details. In order to ensure that the overall effect of the computer renderings of the garden landscape is not affected, there are clear standards for the subject and details. Then establish the rendering range and perspective environment of the renderings, and use AutoCAD, 3DMAX, Photoshop and other three software to build models for the scene.

(2) Material selection and mapping

Although the model has been established, the materials and maps displayed by the model will directly affect the final performance of the garden landscape renderings. 3DMAX9.0 is currently the most powerful software for editing surface materials and textures. The material and texture editing functions of this software are used when making three-dimensional models of garden landscapes, which can not only improve the performance of the model, but also reduce the workload, which is convenient and quick.

(3) Lighting and rendering output

The light source in the garden landscape renderings has an important role to play in the renderings. Because it is the key element of the rendering, it not only illuminates the object, but also controls the emotional direction and atmosphere of the scene. At the same time, after the model has determined the viewing angle, it is necessary to render the scene accordingly. Because there are many computer-aided software with rendering functions and different rendering effects, you need to be careful when choosing a rendering tool, and you must first clarify what kind of effect you want to achieve through rendering.

3.2 Perspective View of Garden Landscape

We mentioned earlier that the computer renderings of garden landscapes require Photoshop editing. This is the same as the final brushwork modification and final painting color of the article. The computer graphics of the garden landscape need the final image processing to show its corrected highlights. In order to obtain high-quality and high-level computer renderings, it must be modified and adjusted by image processing software. At the same time, special effects can be added to make the design concept more prominent.
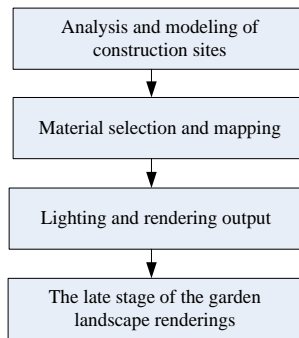
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Figure 1: Technique implementation steps.

4. DISCUSSION

4.1 Modeling Step Analysis

The software used for modeling is AutoCAD and MAYA series software. AutoCAD is a very accurate drafting program, which can be used to process the drawing of the engineering plan, and then switch to Maya through data exchange to use 2D plan as the 3D positioning template for modeling. In the data If you want to import MAYA in 3DS format during the exchange, you need to install the 3DS input plugin first, and load and activate it in the MAYA plugin manager.

In AutoCAD and MAYA series software for garden modeling, there is a common question: Should some plants and other landscapes be modeled? Our answer is that the plant modeling in the garden renderings is both theoretical and practical. All are feasible. It can be operated from the following aspects.

(1) Because it is a background model, the designer can only perform simple shape modeling on it, and then process it through mapping techniques, which can be completely comparable to the effect of post-synthesis processing.

(2) Nowadays, the development of PCs is changing rapidly, providing the necessary space and speed for landscape modeling, and using the powerful Paint Effect function of MAYA, after first creating plant brushes related to engineering projects, they can quickly be used in 3D. Add plants to the scene. Of course, we can also use the Amap plug-in of Maya to make realistic 3D plants.

(3) As shown in Figure 2, for the effect map of the garden, the software Xfrong, which specializes in the production of organic structural objects, uses its special mapping and distribution techniques to make a large garden ecosystem, and then inputs it into Maya for integrated rendering. This This method is conducive to creating garden renderings with false and real photo effects. As for whether the free-space, multi-curved layouts such as pavilions, pavilions, rockery, and sculptures need to be modeled, the key depends on how to deal with them later and the time requirements.

Figure 2: Landscape rendering.

4.2 Rendering Effect Analysis

As shown in Figure 3, it is a perspective view of a garden landscape. The rendering process often uses the renderer integrated by MAYA for rendering. MAYA's own texture materials and lighting tools provide powerful light and shadow control and texture material creation. And editing functions, it can not only create a variety of real texture materials in real life, but also create unreal texture materials that do not exist in real life. After careful creation, designers can realistically reproduce the various models in design drawings. Texture and characteristics. A key technique for accurately creating materials is to accurately align the bitmap and its editing modifiers with the model, and pay attention to the scale of various texture materials, so that it can be just right.

After the model is set with lighting and materials, it can be rendered by computer. The frame of the manual effect map must be determined at the beginning, and the frame of the computer effect map can be determined before rendering. Its size is determined by pixels ((Pixels) size.

Figure 3: Perspective view of garden landscape.

4.3 Post-Processing Analysis

Attributes	2011	2012	2013	2014	2015	2016
Market value scale	2689	3187	3743	4318	4970	5682
Growth rate	0.00%	19.00%	17.00%	15.00%	15.00%	14.00%

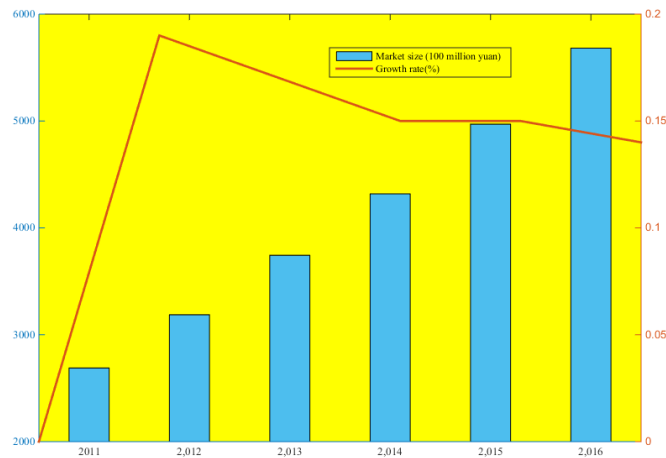**Table 1:** China's urban gardening market scale and growth rate from 2011 to 2016.

Figure 4. The scale and growth rate of China's urban landscaping market from 2011 to 2016.

As shown in Table 1 and Figure 4, the current scale of China's urban landscaping market has been increasing year by year, from 268.9 billion yuan in 2011 to 568.2 billion yuan in 2016, which has continued to increase every year, which shows the importance of landscaping and landscape The importance of landscape.

In the technique studied in this article, the post-processing process is similar to the final adjustment and retouching process of the hand-drawn effect map. It is the retouching process of the image file obtained during the rendering processing stage. For the garden effect map, it is mainly necessary to add scenery and background. This is an important step and takes a long time. The application software is mainly Photoshop, which is the most excellent flat image processing software today. The perspective effect of the scenery (especially the plants) is referenced in the rendered image. The perspective angle is obtained by adjusting the size, direction and color of the inserted scenery according to its perspective law and experience.

As with other types of renderings, the landscape files in garden renderings are generally obtained in 3 ways: ⊖ There are many software products on the market that contain various types of scenery; ⊜ Scanning to obtain information about various types of books and magazines The beautiful pictures of the scenery are then processed in Photoshop; ⊛ Obtained directly from real life by using a digital camera.

4.4 Analysis of the Effect of Garden Landscape Renderings

Estimated growth rate	6.93%				
Years	2018	2019	2020	2021	2022
Garden market size	2638.51	2815.27	3020.43	3221.42	3439.57

Table 2. Statistics of garden market scale

As shown in Table 2 and Figure 5, the scale of the garden market is gradually expanding with a growth rate of 6.93%. The garden landscape market is a huge development trend. Studying the techniques of creating landscape perspective renderings will play a significant role in future development.
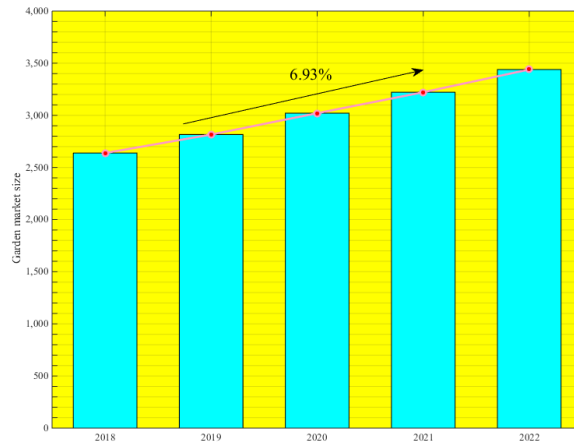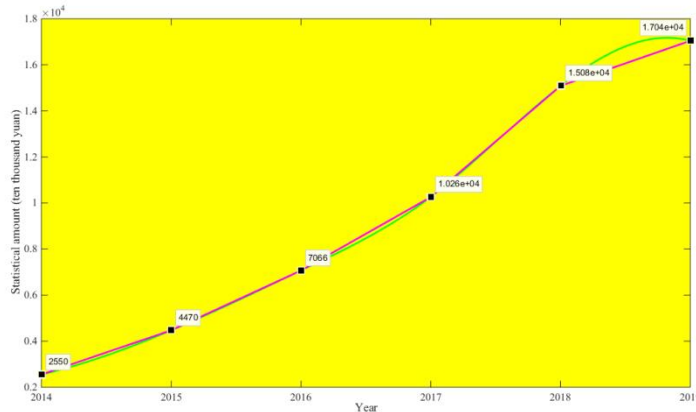
Figure 5. Trend of garden market scale

Figure 6. Annual growth trend of scenic investment (Unit: 10,000 yuan)

(1) It is helpful for designers to understand intuitively and deepen the design concept

As shown in Figure 6,designers can intuitively consider their design results in the horticultural design renderings, further deepen their design concepts, and at the same time, help further develop the designer's thinking and actively try different design techniques in the design process. It also has a positive meaning, allowing designers to inspire more creative inspiration in a near-real experience.

(2) Facilitate communication with the owner

As shown in Figure 7, with the rapid development of society, garden landscape design is not only a matter for garden designers, more and more people are also participating in the discussion of design results. The garden landscape renderings can truly reflect the design results, and even ordinary people can intuitively understand the designer's design concepts in the renderings. The designers can also make necessary improvements and improvements to the design plan in the opinions and suggestions put forward by different personnel to achieve the perfect unification of the practicability and artistry of the plan.
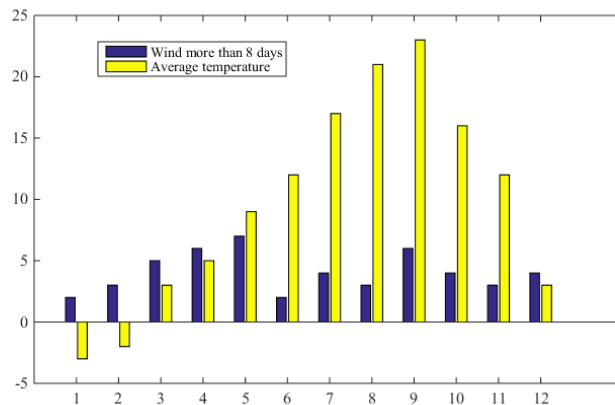
Figure 7. Temperature and rainfall statistics.

5. CONCLUSIONS

Using a computer to draw a garden effect map provides the possibility to accurately express the designer's design ideas and concepts, and the computer is revolutionizing the designer's design concept while fully expressing the design concept! With the development of the information age "Computer multimedia technology is maturing" Garden planning and design multimedia technology is gradually maturing "The post-processing of garden planning work will ultimately depend on the production of multimedia systems, which requires designers to understand and master more relevant computer production technologies "Improve the quality of the design itself and the level of decision-making in the garden.

To have a good aesthetics, the production of perspective renderings requires not only strong professional knowledge, but also profound aesthetic skills. Knowledge of gardens such as trees and flowers is easy to master, but aesthetics is not the case. Heroes are sad about aesthetics. Aesthetics include aesthetics and painting. In modern garden landscape design, many designers have weak aesthetic skills, or have strong painting skills, but they have a better understanding of the situation Superficial, there is a gap with the real environment, or deeper understanding of the scene, but because of poor painting skills, the use of image language to express rigid and rigid, therefore, to draw a perspective effect map, you must hone your aesthetic and painting skills to pass the aesthetics.

The bitmap rendered from 3D is generally difficult to meet the requirements of the picture composition. The composition needs to be readjusted in PS to make the effect picture composition more perfect and reasonable. Generally speaking, the picture composition is based on the position line, frame ratio, and balance principle. (Not seeking symmetry, but seeking balance) and other aspects to avoid division, repetition and tangency. But it is more important to observe more things around you in life, have a deep understanding of life, explore the laws in actual drawing, accumulate experience, and form your own style, in order to create works with life.

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