

Research on the Urban Landscape Design based on Digital Multimedia Technology and Virtual Simulation

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Abstract

New media technology creates a new feeling, new experience and new ways of thinking, nowadays, life everywhere is full of digital signal, urban landscape as we live the main environmental space, with its highly sensitive of science and technology and unavoidable by the impact of digital technology. In this paper, we analyze the application of digital multimedia technology and virtual simulation in urban landscape design. On the one hand, the computer digital mapping tools provide a more effective way to deal with three-dimensional space, so it is very popular in the landscape design. On the other hand, the advent of digital technology makes urban landscape design no longer simply rely on real physical space, modern city landscape design always made use of digital multimedia technology, makes the urban landscape design space is more complex. In addition, the digital multimedia technology not only brings the technical support to the urban landscape design, but also reflects its value in the aspect of appearance, color and so on.

Keywords: *Digital multimedia technology, virtual simulation, urban landscape design, 3D landscape*

1. Introduction

With the continuous development of society, the digital media in the social life reflects its powerful force; it penetrates into every aspect of our lives. Life everywhere is full of a digital signal, digital technology, and urban landscape as we live mainly in the bad environment, space, with its on science and technology, highly sensitive and unavoidable by the impact of digital technology[1]. Today, the development of economic globalization is due to the development of digital technology, network technology and other comprehensive technology. In the information age, the formation of the industrial era of different market models, business models[2-3]. The multimedia digital technology makes the economy is developing rapidly, thus improving the people's living standard. The rapid economic development has led to the development of urban landscape and architecture, which has created a good foundation for the urban landscape design. New era, will form a new value system and new ideas, it is often the transformation of technological means, social and economic transformation and cause[4]. New media technology will create new feelings, new experiences and new ways of thinking, social interaction space, including people's main gathering place - the city is also deeply affected. Media in the information age, the mass and the landscape architect's way of thinking, aesthetic values and living space needs are changing, new values, aesthetic and technical point of view and design theories will stimulate and promote urban landscape design to continue to absorb a variety of nutrients to enrich themselves[5]. Through the multimedia technology to shape the new urban landscape design is a new research direction. Information and digital survival will be brought into the digital environment with the daily life; the media is the first area.

Architecture in the context of the multimedia era is also constantly re-self-research to meet the needs of the era of rapid development.¹

Landscape design as a kind of expression of social life and social culture, it reflects the construction of a means of science and technology level, cultural background, social background. Into contemporary American under the influence of information technology on the landscape design of the degree of concern can be described as unprecedented, asking people to modern information technology as a means to re-examine the contemporary landscape design. In the Japanese government advocated State Park to create a model, digital multimedia technology, and intelligent features play great role, integration and utilization of the CALS and GIS technology, has been formed from the importance of information technology to development and application of information technology to verify the information technology to the development of information technology development in a virtuous circle model [6-7]. In addition, in Anhalt University of Applied Sciences held the 8th information technology landscape design international conference, the conference theme of Digital Landscape Design in Landscape Architecture fully reflects the concern in the world under the influence of information technology for the landscape design. The interactive performance of the digital multimedia technology in the University of Leeds has been studied in practice, which provides a favorable demonstration for the interactive role of multimedia technology in landscape design[8]. Currently has about digitized design technology and virtual reality technology involved in the landscape of research, but the emphasis on both media design, digital design and virtual technology, but very little systematic research multimedia technology and mode of thinking in the landscape in the specific application.

The purpose of this paper is the multimedia as a tool of a kind of technology and its impact on the new aesthetic thinking into the urban landscape, and under the background of digital technology to study the relationship between urban landscape and multimedia technology. This thesis attempts to explore "multimedia" intervention and rich language and the way of the urban landscape, try to analyze the change of urban landscape in the era of multimedia design concept, design method of the development, design work of new content and new forms of, mining it in the urban landscape in the multi value to shape have features of information age and more human urban landscape space. Urban landscape under the influence of digital multimedia technology, the development trend of gradually reflect human nature, health, regional, diversified and innovative type of landscape, contemporary and future urban landscape also will be more and more use of multimedia technology.

2. Digital Multimedia Technology in Urban Landscape

2.1. Multimedia Technology

In the environment of the global information society, digital technology expands the concept of landscape design, ecological, human, pluralism, technology and other design, the design means of the contemporary landscape design is constantly updated, with its own distinctive characteristics.

- 1) Intelligent design means: Modern landscape environment design, with the help of technology, regulate climate, temperature, humidity, light, air flow and other natural conditions, the formation of a specific environment landscape. In addition, the landscape architecture itself through the power device, optical fiber sensing, computer programs to respond to the surrounding environment, the realization of intelligent environment.

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- 2) Interactive participatory design: The interactive design of environmental landscape mainly includes the interactive device (Installation Interactive) and the game art. This method is realized through the computer hardware and software programming platform, automation technology combined with the computer input and output equipment and some of the performance of the integrated material to achieve. Interactive design brings a strong sense of experience, fun, and aesthetic sense is the background of the information age, a major advantage of the landscape design.
- 3) Quantitative means: Landscape design can use digital technology to achieve the design of precision, batch, diversification, in order to achieve the desired environmental goals.
- 4) Cross means: Information era is a large amount of information gathered from different regions, nationalities and countries, widespread instant communication of new material, technology and idea, the form and meaning of landscape of the ensuing expansion, with different features.

2.2. Development of Multimedia Technology to Design

The beginning of the information society indicates that the Digital Age will replace the "pen of the times" as the main way of people's cognitive society. Computers speed up the speed and efficiency of information processing, improve people's cognitive level, and change people's ideas. The computer age pen value will not disappear completely, but no longer dominate. For traditional landscape design, pen and paper is design is an indispensable tool. Nowadays, computers have taken the place of the traditional pen and paper, and become a major design tool of the design work; it is more accurate and more efficient work characteristics. Computer software powerful drawing and editing functions can help designers to fully express the design intent, designers can extricate from the confusion of pen, ink, paint, and paper, to focus more devoted to the expression of design ideas and concepts. Draw a complete set of design drawings required different design software, these all belong to the modern landscape design drawing tools. All software abound, such as the American LANDCADD, 3D landscape, landscape design ware, Finland VIDRe-gion, and domestic YLHCAD garden aided design and drafting system, toss garden design system *etc.*. However, due to the different requirements of regional countries, the functional effect of the requirements are not the same, or the norms of the differences, cost control and other reasons, the application of these software in different countries is not the same as the distribution. At present, garden design process is most widely used in modeling software have AutoCAD, 3ds max, rendering software commonly used have 3dsmax, 3DVIZ, Maya, Softimage, Lightscape, accu render, late processing software such as Adobe Photoshop CorelDRAW. At the present stage, the most commonly used garden mapping software is the combination of AutoCAD, MAX Adobe and Photoshop 3DS



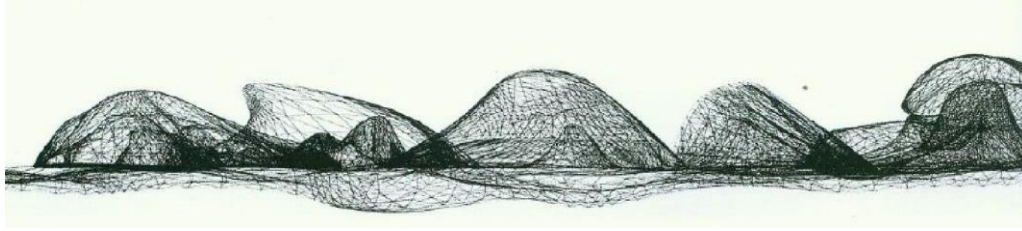


Figure 1. The Computer to the Complex Morphological

Computer is a very special form of multimedia, from on the whole that provides more broad more real experience, is holographic, dynamic, interactive, real-time. At the same time, some conventional ways of reproduction is difficult to deal with the problems, such as complex space form and consists of curves and surfaces, to the computer is very easy, as shown in Figure 1. The reproduction of light, color and material is more efficient, more delicate and more close to the prototype structure of the reconstructed object than other conventional methods.

Simulation technology is based on control theory, system theory, similarity theory, and similarity theory and information technology as the basis, for the tools of computer and special equipment, with system model of a real or imagined system for dynamic study of a multi-disciplinary comprehensive technology. Due to the visualization of the technology and the performance of three-dimensional space, it is very popular in the landscape design, and it is widely used. At present, in the field of landscape design, summed up, this technology is mainly reflected in two aspects:

1. **3D graphics rendering:** The rendering of 3D graphics mainly includes rendering performance and 3D animation, which is the visual expression of landscape architecture. This technology is often used in the modern landscape design, in order to determine the effect after the completion of the landscape, the client to a more intuitive impression, the program is successful; the program is a strong reference to the implementation of. As shown in figure (Figure 2), three dimensional realistic simulation results, so that designers more directly to show their design ideas and results, to give people a more realistic, can be a sense of environmental design.
2. **Virtual and dynamic landscape simulation:** The basic features of dynamic landscape simulation are similar to the characteristics of virtual reality technology, namely: immersion, interactivity, and imagination. Virtual simulation technology to create a real sense of reality, and create a new situation for landscape simulation. Animation landscape is one of the techniques of landscape simulation. In the animated landscape, the operator can accord their own needs, at any time to change perspective, position, and course, so as to better feelings and evaluation of landscape works, convenient design personnel in a timely manner to the landscape scene design modifications.



Figure 2. Digital Image Processing Software to Create Three-Dimensional Effect Map

Augmented reality technology is the hot spot in the research of virtual reality technology in recent years. The simulation technology and traditional virtual reality technology is slightly different. It pays attention to the virtual material joining real space environment, enable people to participate in the real environment, feel the virtual physical landscape to bring their feelings are not the same. At present, the landscape simulation based on augmented reality has been used in the transformation of the old city and the planning and design of the scenic area because of its visual and real effect. It will become a new assistant technology of landscape design. The "Time Big" project in the United States is a technology that is used in the performance of the project. This program is designed by Electro land, the building program mainly includes office space, art museum, as well as leisure green space, and the use of multimedia technology in its exterior makes the whole building lively and interesting. Animation shows people is the actual image and model image overlapping after the effect, so that people feel real, as shown in Figure 3 and Figure 4.



Figure 3. The Simulation Technology in Construction Scheme



Figure 4. The Effect of the External Wall Elevation

In every development stage of landscape design, it is accompanied by the participation of technology. Nowadays, the arrival of the global information age, urban landscape design is also in the gradual development of digital multimedia technology penetration. But all is not independent of the effects of landscape design, the more is the cooperation of two or more digital technology, digital multimedia technology using its powerful technical force, regardless of the methods in the design or in design technology, the urban landscape design to a role. Digital multimedia technology used in urban landscape design, it has opened up a new world of urban landscape design. The urban landscape in the design process, the procedure steps to the concrete design method and so on has produced the enormous change.

3. Application of Digital Multimedia Technology in Urban Landscape

3.1. Influence of the Digital Multimedia Technology on the Creation of Urban Landscape Works

The advent of digital technology makes urban landscape design no longer simply rely on real physical space, modern city landscape design always made use of digital multimedia technology, makes the urban landscape design space is more complex. The space design of the virtual reality interaction has gradually become the focus of attention of the modern landscape designers. Then, the space creation of the virtual and real interaction is mainly reflected in the following points:

- 1) Entity landscape elements and virtual landscape elements has mutual integration, mutual penetration.
- 2) Virtual interaction of urban landscape space design creation, more and more attention to the mutual exchange of information and communication.
- 3) Landscape space, information, people can better get along with the fusion; they form an interactive relationship between.

In Chinese Taipei sea anemone sculpture, as shown in Figure 5, the designer realization of beauty at the same time, pay attention to the "perception" of the design. The entire sculpture, the distant view of simple elegance, ups and downs, near to see when it is found that this is a complex, new landscape structure. The wall is covered by a flexible rod sculpture tens of thousands of translucent, like sea anemone tentacles. Each rod is embedded in the wall with a gradient of depth, forming a relief effect, causing the viewer to explore its structure, use, touch and the material used to encourage curiosity, to encourage a variety of forms of interaction.

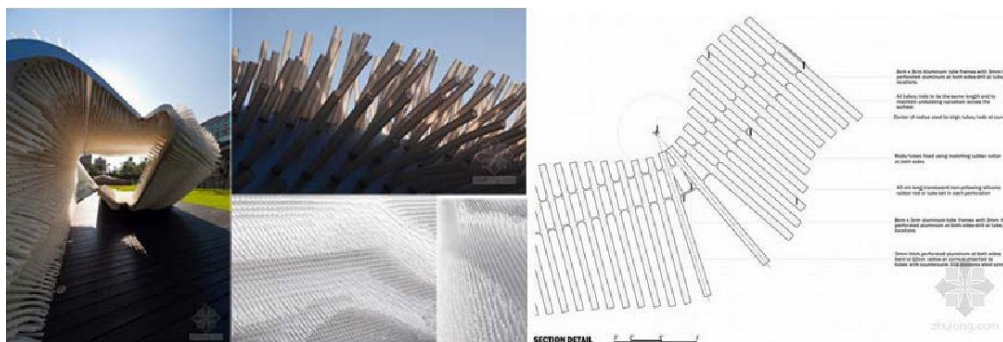


Figure 5. Anemone Sculpture

3.2. Multimedia as a New Material for Urban Landscape

The different use of materials is often the different interpretations of the design concept and expression, different materials to achieve the design effect is different. Today's landscape designer should try to use new materials to express their design ideas, in the reference and inheritance of both at the same time, creative art in play, bold innovation, make the design work is new and has the feature of the times. Each era has its own specific representative materials, and each material has its own ability to replace the performance, the development of new materials and update for the urban landscape design has opened up a new field of artistic expression. The influence and change of the digital multimedia technology has attracted extensive attention of designers, and has been used in practical cases to reflect the charm of different designs in the past. Media technology and the integration of a variety of conventional materials enhance the use of the same time to expand the scope of

application, resulting in the formation of the multimedia technology has become a completely new design materials are free to operate. Because these materials is ultimately through the basic lightning to express various images, image and text display, so how to organize these virtual information also means that how in the design process of the organization the combination of multimedia technology and landscape elements, which means the exploration of new construction means

Now, the construction of a variety of skin, LED display is conducive to the construction of information expression, at the same time with the surrounding landscape integration, reflect the functionality of the site. Multimedia digital technology will sound, shape, light, color and other integration, making LED show a more rich landscape effects.



Figure 6. LED Medium Surface of Architecture Landscape

In addition, the Crown Fountain as a public works of art and urban landscape sketch, no doubt by the public's favorite, can be said to be a successful landscape works of the city. It is located in the Chicago Millennium Park Plaza, the designer for the Spanish artist Guillaume-Pulang SA Jaumes Plensa (such as Figure 7). The crown fountain is different from the old one, because it is a modern urban landscape with the pursuit of light and image. Fountain at the bottom of the black granite reflecting pools, the relative standing of two glass was built of brick, high 15.2 meters (50 feet), digital multimedia technology control LED screen wall, the wall is currently the world's biggest TV wall. Artists making 1000 people in Chicago's face, each facial expressions stay each 5 minutes, from the smile to the face until finally lips looks like an interesting contemporary strange shaped gargoyle, water will splash out, resulting in from the mouth water phantom. The LED multimedia device with its most advanced technology means occupy Chicago Downtown urban Millennium Park the most originality fountain; it is water, artistic image and multimedia LED technology synergy generated by the harmonious work of art.

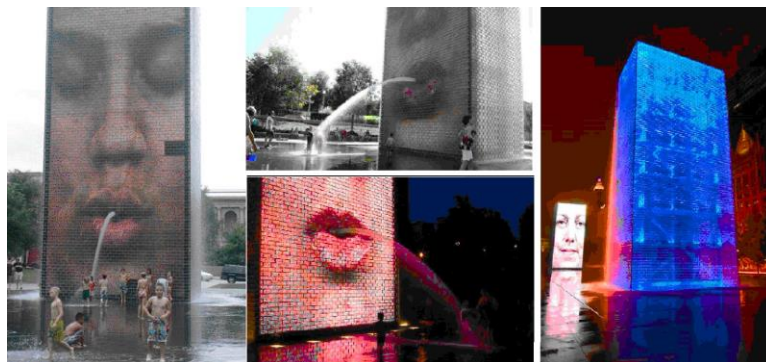




Figure 7. Crown Fountain

Urban landscape sketch covered a wide range of fields, including architecture, sculptures, murals, pavilion, pavilion, and other essays; life facilities pieces - seat, a telephone booth, mailboxes, bins,; the implementation of the road Sketch -- the station license, street lighting, road signs. The impact of digital multimedia technology on the design of urban landscape sketch is huge, which makes the form of sketch intelligent and diversified. Under the support of digital multimedia technology, the urban landscape sketch makes it more realistic and brings people a strong sense of visual impact. Under the designers a powerful imagination, people of a powerful and unconstrained style ideas can be implemented, and accurate. Barcelona contemporary artist and sculptor Plensa Jaume has recently held its first major solo exhibition in the UK. Works contains many large scale portrait sculpture (Figure 8), combined with transparent structure material, the sculpture to form a hollow appearance in order with the surrounding natural landscape integration. Designers will be the transformation of the sculpture for the building, visitors can walk into work experience is not the same feeling, many works are integrated into the light, sound, word combination of multimedia technology, they exude digital symbols, so that visitors have a different sense of space.



Figure 8. Sculpture Landscape" The House of Knowledge"

3.3. Multimedia Technology to Provide Design Language for Urban Landscape

The performance of multimedia technology can also affect the design of urban landscape. Some designers from multimedia display forms, such as pixels system, looking for the landscape design of a new language, makes the design presents the works has the sense of information times. In the form of technology, such as pixel system, looking for the new language of landscape design, making the design works showing a sense of the era of information works. In this project, the designer uses the expression form of multimedia to realize the design of architectural skin landscape. "Pixel" (Pixel) is a kind of unit used to calculate the digital image. It contains images and elements of the two

meaning, by the Picture and Element two words. As we take photos of the same, when the enlarged several times, we will find these continuous tone picture is composed of a color of a similar small squares, these little cubes is pixel.

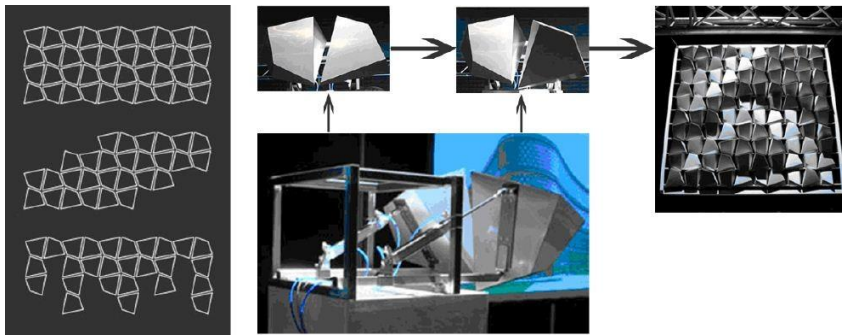


Figure 9. The Effect and Details of Shining Building Appearance

4. Multivariate Analysis of Digital Multimedia

4.1. Digital Multimedia Brings a Variety of Urban Landscape New Experience

Digital multimedia technology to the urban landscape design has not only brought the technical support, in appearance, color and other aspects of its value. It's intelligent control system, often give people the visual impact, often let people experience the novel dream of the landscape effect. Traditional landscape design pays more attention to the combination of function and form, and the urban landscape design under the support of digital multimedia technology, in the premise of meeting the function, often can give the world a wireless sensory stimulation. People in the new urban landscape design works, visual, hearing, smell, touches are able to experience the joy of work. Of course, different urban landscape design works, may meet different sensory stimuli, will be the design of the expression of the content and design ideas. In addition, multimedia technology in vision to bring powerful feelings of landscape design case is very common, it often is colorful and endless changes, the dream surprisingly form appears in front of people, making the audience often for him to stop. For example: the color laser performance, it is a set of sound, light, electricity, shadow, water, fire, the scene is equal to one of the special art performances, but also to create gorgeous dazzling light and shade effects. Formed by LED display Dream Corridor Road, as shown in Figure 10, it shows advertising and entertainment information; or form various patterns as ceiling decoration; or by the municipal civil marriage platform, and so on. In short, this new form of Dream Corridor to the public to bring the impact and enjoyment of the senses at the same time more can be used by the public.



Figure 10. The Landscape Effect of Beijing Dream Corridor

4.2. Functional Embodiment of Multimedia Technology in Urban Landscape

In the commercial nature or other major urban public space, the use of multimedia devices, can be used in the field of practical fields to create economic benefits. For example, the multimedia device applied to advertising, achieve the combination of landscape and business, so as to bring a new sense of the times and the breath of landscape space, and can bring to the business unusual advertising effect, can be said to be a win-win choice. Some companies have seen its eye-catching advertising effect. New York PETRONAS Twin Towers square, the skyline design competition, the Electro land design team design "sky screen" won the competition awards (Figure 11). The project when night falls, reveals a LED light source of the display screen with slow speed up into the air, finally in the set up computer systems is higher than that of square 150 meters place to stay down, as if extraterrestrial like hanging in the air. The color of the light, as well as the information displayed by the ground system control, can be used for commercial advertising and the release of his information. Picture presents "SKY" letter style, no information display in the form of electronic grid, the grid level is five meters apart, the project to a variety of forms for people to convey a variety of information.



Figure 11. The Landscape Effect of "Sky screen"

5. Conclusions

Under the influence of multimedia technology, the concept of landscape design update embodies in the view of the new human, concept of time and space, view of nature, view of technology, aesthetic and cultural outlook, they to the urban landscape design injected fresh blood. New era, new technology to promote the formation of new thinking, so people have a new aesthetic and the urban landscape design and put forward new demands. Media technology than just behind the urban landscape as a technical role, but also to stand in front of the stage, in order to form the identity of the elements will be integrated into the urban landscape design content, as part of the landscape design. Under the influence of multimedia technology, the urban landscape, they show a variety of forms of material, virtual, virtual and material coexistence. The information which it passes is more and more widely, and the way people accept it is more and more abundant. The emergence of a variety of innovative urban landscape, and constantly meet the needs of all aspects of people, they are more and more with the times and innovation. The application of multimedia technology in the urban landscape will become more and more widespread, people will live in a more colorful and colorful urban environment.

Urban landscape design is the use of digital multimedia technology; these pair of eyes continues to absorb useful adoption points to enrich their own. The network multimedia, landscape architects have designed tentacles extend to all aspects of social life, designers to assimilate and learn more master works and design concept, designer's vision widened. On the other hand, the designer's own ideas no longer limited by traditional technology,

the form of landscape design work began to diversified and intelligent. Landscape design for designers vision to expand their own will expand, design work is more show the times and continuation of the traditional essence, for people service characteristics, landscape design as well as to the nature belongs to the nature of society are fully demonstrated. However, the constant demand of landscape design itself has prompted the continuous application of digital multimedia technology in landscape design. Digital multimedia technology has updated the new technology to support the change of landscape design, so the landscape design can be expanded continuously.

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