



Application of Artificial Intelligence Based on Symbiosis Theory in the Design of Landscape Park

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Abstract. Artificial intelligence plays a bridging role in the interaction between humans and landscape parks. It is of great significance in coordinating the relationship between humans and nature and closely linking them together, and thus achieving organic unity. Through human infrared sensing technology, high-end control system technology, 5G intelligent management system and other technologies to realize the application of artificial intelligence in landscape park design, make landscape design more varied, flexible and interesting, and realize the dynamic interaction between man and natural environment.

Keywords: symbiosis theory, artificial intelligence, intelligent design, landscape park.

1 Introduction

Hope to make landscape park in the design of the application of culture, time, subject and object, the structure of symbiosis.^[1] Abroad on the study of "symbiosis" of "symbiosis", originally from ecology in 1879 by a German mycologists DE berry is put forward, then the Japanese architect black chuan JiZhang created the idea of "symbiosis", he on April 20, 2001 published the symbiosis of The Times, has made the research on the effects of urbanization on the city, city residents, and concludes that urban and natural symbiotic first starts from the nature, natural symbiotic important content not only including humans and other creatures, the conclusion of the green environment but also include innovation;^[2]"The symbiosis city" for its metabolism and circulation, information, ecology, sustainable development, the concept of symbiosis and genetic research, and through the practical work on the theory of "symbiosis city".^[3] The earliest domestic involves the symbiosis is on June 30, 1981, in the field of ni of books published, jian-guo wang rice fish symbiosis theory research, by studying the biological survival competition and dynamic collaboration between implementation in the paddy field ecosystem the effective control of material cycle and energy conversion.^[4] Based on the research of the related literature to learn at home and abroad for the symbiosis theory, artificial intelligence and landscape park, the three links are two opposite and related study is less, has not related researchers will all three together. Article think

based on the symbiosis theory, artificial intelligence, park landscape design combining with better, and the symbiosis theory to study the problems in application of intelligent design in landscape park, find and solve the problems, so as to better realize the harmonious coexistence of man and nature.

2 The Application Status of Artificial Intelligence in Landscape Park Design

The technology related to artificial intelligence have made landscape parks more diverse, interesting, and interactive in design, which has led to rapid development of landscape parks. However, in the process of development, artificial intelligence also brings some problems.

2.1 Pursuing results but damaging the ecology

Some designers blindly pursue artificial intelligence technology to bring people a new visual, auditory and tactile interactive experience, and the relevant staff arbitrarily changed the topography without conducting the field investigation, This has led to damage to the original ecological environment, For example, in order to pursue the overall color effect, the use of equipment to detect plants that are not adapted to growth not only leads to high maintenance costs in the later stage, but also reduces the survival rate of plants, thereby causing damage to the natural environment.

2.2 Overemphasizing technology to the point of neglecting culture

The eraization of artificial intelligence has led most designers to increase investment in science and technology and ignore cultural inheritance. The landscape park is not only to provide an environmental space for people to relax and entertain, but also to highlight the cultural heritage of the city. Artificial intelligence should be combined with urban history and culture in application, such as the music fountain of Meishan Dongpo Urban Wetland Park, which exudes the charm of Dongpo culture in design, presents a characteristic fountain with unique Meishan culture, and is a beautiful "city business card" of Meishan City.

2.3 Refusing intelligence and continuing tradition

Artificial intelligence is to seek the effective ways to a computer to replace human labor, artificial intelligence, not only can real-time monitoring the entire process by the program, also has the self learning function, able to independently solve complex problem and continuously improve their intelligence level.^[5]Due to the continuous improvement of the level of intelligence, The field of application of artificial intelligence is expanding, (As shown in Figure 1) in many aspects of wisdom has exceeded manpower,

causing people to fear being replaced by intelligence, thus refusing to use artificial intelligence technology to continue the traditional design method.

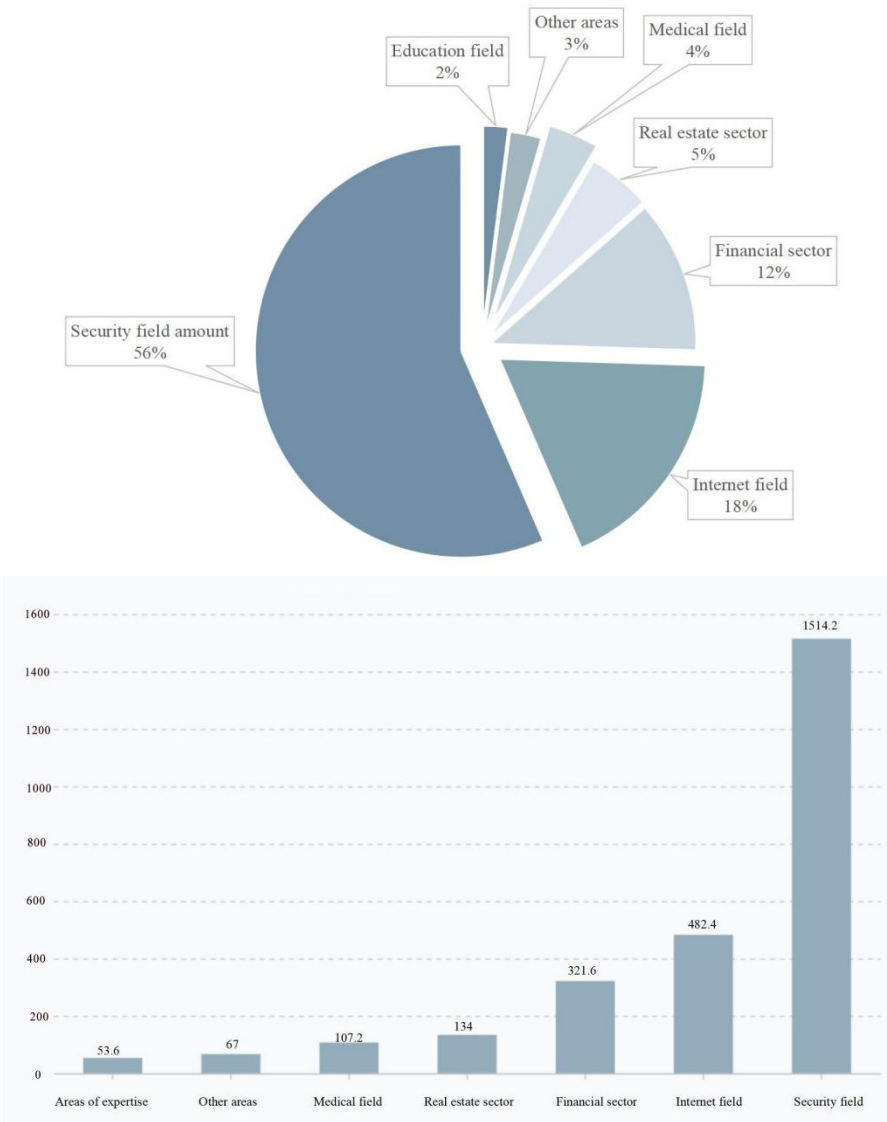


Fig. 1. The proportion of artificial intelligence in each industry in 2022 (sector chart) and the scale of artificial intelligence in each industry - the total scale is 2.68 trillion yuan (bar chart)

(Figure 1 is from the iResearch Prospective Industry Research Institute, and the specific data are calculated and obtained)

3 Principles to be followed by artificial intelligence in the design of landscape parks

3.1 Ecological and natural principles

Most of the traditional landscape design is to transform, redesign, and micro-update on the basis of not destroying nature. For example, the wetland park in Harbin Cultural Center, from "wilderness" to wetlands, always adheres to the concept of being close to nature and protecting nature, and while respecting nature, we design comfortable and beautiful natural environment spaces for people.

3.2 The principle of cultural co construction

The landscape park is a reflection of the cultural heritage of the city, so the application of AI needs to combine the Material culture of the city to play the role of cultural inheritance. For example, the design of the water feature fountain in Cangzhou Garden Expo Park adopts picture fusion technology imaging and high-end control technology to present ecological culture, intangible cultural heritage culture, red culture, etc. through a giant water curtain, showing Cangzhou's unique human geography and spiritual outlook, and expressing the Cangzhou people's yearning for a better life. Through intelligent technology, cultural symbiosis, co-construction and common development are realized.

3.3 Economic principles of safety

Most of the applications of artificial intelligence technology are actually the automation of facilities and equipment formed by manually inputting data and other information into computers. In specific use, people only need to operate it themselves. Therefore, intelligent facilities and equipment need to repeatedly check for safety hazards such as leakage. Focusing only on benefits and costs in construction and ignoring post-maintenance and equipment investment may lead to the design not being carried out as scheduled. Therefore, in the design of landscape parks, the principle of safety and economy should be followed.

4 Application examples of artificial intelligence in landscape park design

Artificial intelligence technology has improved the quality of landscape design, providing people with a more distinctive leisure and entertainment space, to realize the interaction between man and natural.

4.1 Musical fountain in Jiulong Lake Park, Nanchang

The fountain in Jiulong Lake Park is one of the iconic landscapes in Nanchang. Its design mainly adopts high-end control systems and uses sound and electricity conversion devices to achieve interactive experiences such as water screen movies and dynamic lighting. With the ups and downs of the fountain, it forms a diverse color and light shadow interweaving effect, presenting a strong deterrent force. The spray forms of fountains adopt diverse postures for all displays: conical fountains, fan-shaped fountains, columnar fountains, etc., thus achieving the ultimate visual enjoyment. Jiulong lake music fountain with culture, not only in the water curtain movie show older images of the war of resistance against Japan, reflects the history of style; And can improve the richness of the whole park, park in design to keep the ecological balance.^[6](As shown in Figure 2.)

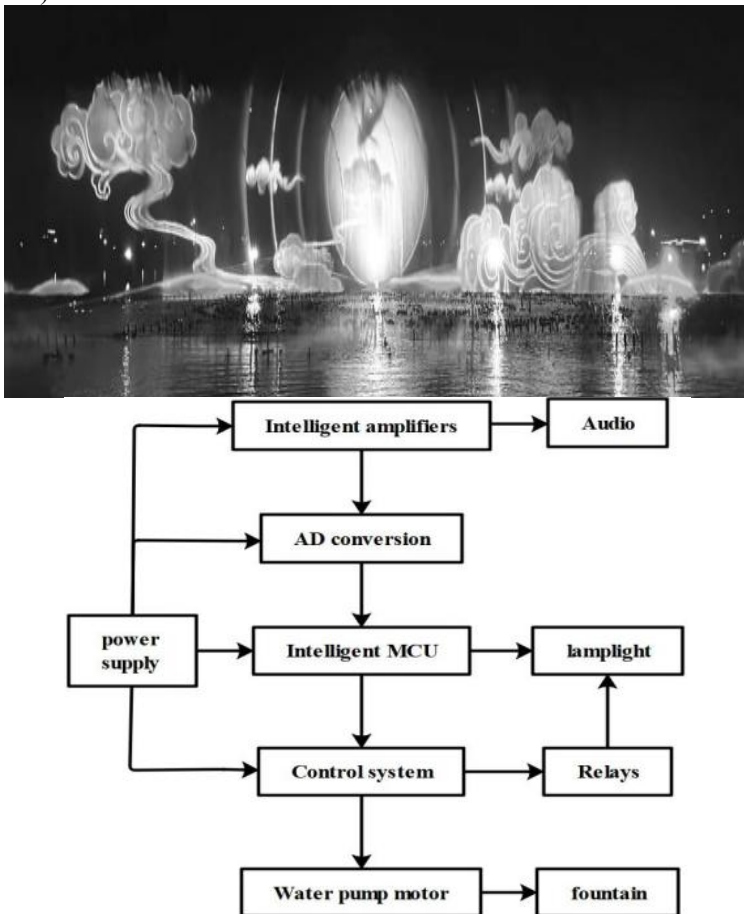


Fig. 2. Smart music fountain and smart fountain control system schematic (from the literature, survey and Internet)

4.2 Public facilities of Dingxiang East Lake Intelligent Sports Park in Shenyang

The public facilities of Dingxiang Donghu Intelligent Sports Park mainly adopt 5G intelligent management system, AI insensitivity sports data collection system, environmental monitoring system, and intelligent terminal display system. The facilities and equipment generate detailed exercise boxes through intelligent detection of body indicators and setting of strength intervals, so each device can display the number of exercises and make detailed daily exercise plans. Intelligent public facilities are used to achieve good outdoor fitness for all. It allows people's fitness activities to no longer stay in limited indoor spaces, and to achieve the interaction and integration of man and nature, to achieve the efficient use of facilities and equipment. (As shown in Figure 3.)



Fig. 3. Smart public facilities (field research)

Artificial intelligence is widely used in landscape park design. Not only used in landscape fountains, public facilities, but also in lighting, ground paving, plant landscape design. To compare traditional design methods and artificial Intelligent design methods, to clearly show the design characteristics and applied technologies of these five aspects through tables. (As shown in the Table 1.)

Table 1. Comparative analysis table of traditional design and intelligent design (From the Internet, research and research, literature review, etc)

	Traditional design	Intelligent design	Application technology
The water fountain	Color、Light spray pattern A lack of variability	Lighting and color aesthetics, Jetting is now available in a variety of forms	High-end control system、Water curtain projection technology, etc
Lighting	People with poor lighting interactive	Flexibility and variability, interactive, interesting combination Achieve the unity of function and aesthetics	The human body infrared sensing technology, Control technology etc
Public facilities	Exterior styling, lack of material, color, beautiful sex and flexibility	Facilities have beautiful sex, home, security, and interactivity Public facilities	5G intelligent management system、AI data acquisition system etc

		equipment utilization rate is high	
Ground shop	Colour, lack of variability and beautiful sex shop form The high cost	Color, the shop is morphological diversity, interactive Construction cost is low	Projection technology VR technology BIM technology etc.
Plant landscape	Colour is tie-in, planting categories with lack of variability, In the late high maintenance cost	Color matching, planting category matching With variety and aesthetics, Low maintenance cost	Image technology Modeling parameters AI detection technology

5 The Various Effects of Artificial Intelligence on Landscape Park Design

Artificial intelligence technology makes landscape parks more intelligent, humanized and ecological, and promotes the sustainable development of landscape parks.^[7]

5.1 Intelligence of landscape parks

The intelligence of landscape parks is mainly reflected in two aspects. First, intelligent management services, mainly for managers or staff, as well as their daily management and maintenance of the park, including intelligent ecological detection, intelligent lighting, intelligent irrigation, intelligent management etc; Second, intelligent entertainment experience, mainly for users, including smart guides, smart trails, smart facilities, etc. Based on the wide application of artificial intelligence in landscape park design, it realizes the close connection between things and things, people and things, and people and people.

5.2 Humanization of landscape parks

Artificial intelligence will take more into account the influence of people on landscape parks in the design and application. In the design, it has a more humanized feature. For example, intelligent outdoor fitness, taking into account the differences in the physical condition of users, it uses artificial intelligence technology to detect the user's body indicators on outdoor fitness facilities, and conducts strength tests, and the facilities and equipment have electromagnetic resistance dual-function training, which can better ensure the safety of users, To achieve healthy, scientific and effective outdoor fitness, the use method is also easier to understand. (As shown in Figure 4.)

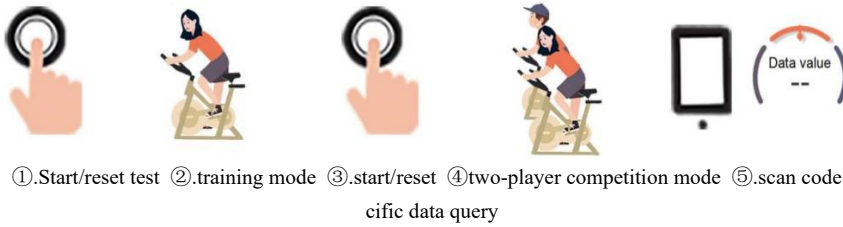


Fig. 4. Use method of intelligent upright stationary (Illustration designed by yourself according to the method of use)

5.3 Ecologicalization of Landscape Parks

The application design of artificial intelligence has played an important role in protecting the ecological environment by continuously improving the environmental quality of landscape parks. For example, intelligent lighting, using energy-saving control technology and intelligent sensing technology, reduces the problem of light pollution and realizes the relief of people's pressure;^[8] Intelligent irrigation, using sensing technology and computer technology, etc., determines the specific water content of the soil for irrigation by running preset algorithms to reduce the waste of water resources;^[9] Intelligent modeling parameters, by calculating the proportion relationship of plant landscape matching, the best way to achieve transplanting density and survival rate, etc.^[10] The application of artificial intelligence technology has played a role in promoting the green and sustainable development of landscape parks.

6 Conclusions

With the development of the times, artificial intelligence has become more and more mature, and has been widely used in the design of landscape parks, not only playing a role in beautifying the space and improving environmental quality, but also playing a role in providing people with comfortable, convenient, safe and efficient services. Artificial intelligence technology is increasingly becoming an integral part of landscape park design.^[11] Although the relevant data shows that artificial intelligence technology has been almost perfected, there are still certain problems in the application, such as the lack of guidance in the use of intelligent facilities, etc., and relevant professional and technical personnel are needed to do further research and learning, so as to wait for the further development of artificial intelligence technology in application.

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