Application of Big Data in Improving Landscape Plant Landscaping Method

Liang Huang¹,*

¹Department of Art Design, Chongqing Aerospace Polytechnic, 400021

*Corresponding author email: huangliangab@htjyc.edu.cn

Abstract. With the progress of information technology, the acquisition, analysis and application of data continue to deepen. Big Data (BD) is affecting our life and work, and gardens are inevitably affected. BD brings opportunities for landscape architecture, changes planning and design ideas, and promotes discipline cooperation and data fusion. At the same time, it also brings challenges. The pure data theory and the protection of privacy are the problems we need to face and solve. In view of these problems, this paper puts forward the application research of BD in improving the landscape plant landscaping method. In this paper, according to the current situation of landscape plant landscaping in China, 210 landscape workers and BD technical personnel in China were selected as the survey objects, and the satisfaction of BD technology application was more than 85%, which played a role in promoting the landscape plant landscaping methods. Through the comparative analysis of the standardization, intelligence and scientificty of traditional landscape design and BD landscape design, it is concluded that the indicators of BD landscape design are superior to the traditional landscape design. BD technology provides technical support for the research of landscape plant landscaping methods.

Keywords: Big Data, Landscape Architecture, Plant Landscape, Plant Configuration

1. Introduction

With the continuous development of urbanization, people have a strong demand for healthy and ecological natural environment. Improving air quality and greening quality is no longer the level of urban composition, and plant quality has become a political factor related to people's livelihood [1-3]. How to change? It is neither economical nor realistic to eliminate pollution by "artificial rainfall, fog elimination and strong wind"; it is a long process of system reform to control pollution emission sources; at present, the most basic and effective means is to increase the application of plants in urban space. The emergence and significance of plant landscape in landscape design, in addition to coordinating the main relationship between man and nature, man and city, also organically combines inheritance and innovation through design concept [4-5].

Each landscape design project has its own style and starting point, because the design objectives are different [6-7]. For example, the river regulation in large-scale planning and the master plan of the new town in the development of the new city require the design angle to estimate the details that can
play a role from the aspects of geography, ecology and humanities; for the design of a park of medium-sized city level, the design of street landscape and municipal greening requires the designer to adjust measures to local conditions, from the perspective of planning and garden [8-10]. Although the angle and starting point of each type of landscape design are different, there is a common point in the design concept-the use of plants.

This paper analyzes the actual situation of landscape plant landscaping method in China, and points out that the input of BD in landscape plant landscaping method is still insufficient. This paper established the application research of BD in improving the landscape plant landscaping method. In the research, in view of the characteristics of landscape plants in China, combined with the development strategy of BD technology, it has a positive impact on landscape plant landscaping, and effectively improves the competitiveness of landscape plant landscaping. Through the investigation and analysis of the influence factors of different groups of people on BD technology, this paper believes that the application of BD technology in landscape plant landscaping can promote the modernization of landscape plant landscaping method, so as to enhance the comprehensive strength of landscape plant landscaping.

2. Application Value of Big Data and Plant Landscaping

2.1. Big Data Application Value
BD is quietly happening in everything around us. We browse pictures, online shopping, WeChat, Alipay and so on every day. We've done a lot of data manipulation and invisible growth, and we've generated data and data by accident. BD has been everywhere, penetrated into all aspects of our lives, and is becoming a feature of this era. BD provides new ideas and methods for human to understand complex systems.

For each industry, building a sensitive feedback platform through the data can make the industry see the data more clearly, so as to judge which part is more valuable and can be used. In this way, through rapid data feedback, it can also be adjusted and corrected in time. For individuals, BD can change the way people think. When BD appears, we can use data to solve the previous blind spots. At present, BD is developing at a high speed and large scale, but the current technology level and system cannot meet the application requirements of BD, and its theory and technology are not mature enough. In the future, whether in terms of technology or theory, there will still be some disruptive innovation and development.

2.2. Plant Landscaping
Garden plants refer to the plants planted or preserved in gardens, parks, forests, rocks, ground and basins, so as to increase people's view. According to the different habits, it can be divided into woody and herbaceous. Woody plants are called ornamental trees; herbs are called flowers. Traditional plant landscaping is the use of trees, shrubs, vines and herbs and other materials, through artistic techniques, give full play to the natural beauty of plant morphology, lines, colors, to create a plant landscape for people to watch.

In recent years, with the introduction of landscape ecology and landscape ecology, the connotation of plant landscape has changed. The traditional concept and connotation of plant landscape no longer meet the needs of urban construction. The rise of ecological garden extends the function of garden from traditional recreation and appreciation to the advanced stage of maintaining urban ecological balance, protecting urban biodiversity and promoting urban sustainable development.

3. Investigation and Analysis on the Development of Big Data in Landscape Plant Landscaping
Research shows that more than 90% of landscape plants at home and abroad take BD technology as the core factor of industry competitiveness. In recent years, the application of BD technology in landscape plant landscaping methods began to increase. In the application of landscape plant landscaping method, BD technology has the effect of quickly sorting out BD and strong accessibility,
which enables users to have accuracy from multi-dimensional and multi-dimensional, so as to achieve the maximum data statistical analysis effect of landscape plant landscaping method, and effectively improve the work efficiency and quality of landscape plant landscaping method.

In the research and analysis, this paper adopts two methods, namely questionnaire survey and interview survey. 210 landscape workers and BD technicians in China were selected as the survey samples. In the process of investigation, this paper found that both landscape staff and BD technology personnel involved in the application of BD technology in landscape plant landscaping methods. In this survey, we conducted a data survey on two groups of people. One group is landscape workers; the other group is BD technical personnel. This paper analyzes the development of BD technology applied in landscape plant landscaping methods. The results are shown in Table 1. Based on the two sets of survey results, the application of BD technology in landscape plant landscaping method can promote the advanced nature of landscape plants and enhance their competitiveness.

Table 1. investigation and Analysis on the development of BD technology in landscape plant landscaping methods

| Investigation items                  | Landscape staff (%) | BD technicians (%) |
|-------------------------------------|---------------------|--------------------|
| Play a promoting role               | 89                  | 92                 |
| without effect                      | 3                   | 2                  |
| It doesn't work                     | 8                   | 6                  |
| It is suggested to increase investment in BD technology | 91                  | 95                 |

4. Discussion

4.1. Impact of Big Data on Landscape Architecture

At present, urban planning discipline has carried out in-depth mining and Application Research on BD. The research data types mainly include mobile communication data, smart card data, Internet data, social media data, Internet of things sensor data and earth observation BD. The research content involves evaluation, planning, management and so on. In the era of BD, landscape planning and design also ushered in new opportunities.

(1) Innovation of design thinking

Rise of BD and the digitization of data bring the innovation of planning and design thinking. Traditional landscape planning and design mainly rely on subjective experience and perceptual creation. However, landscape planning is dynamic and complex. This kind of planning method based on personal experience and ability is not completely convincing. The emergence of massive data provides a basis for planning and design, promotes the update of professionals' thinking and consciousness, and helps to avoid one-sided and subjective content in planning. Planning and design guided by massive and multi-source BD environment is an important part of landscape science and technology innovation. The research and application of BD numerical simulation is the data technology support in the future planning and design process. With the development of BD mining technology, more and more practitioners think and solve problems from a rational perspective.

(2) Expand the platform for public participation in planning and design

Landscape planning and design is usually dominated by the subjective will of the designer or the values of government experts, which is a top-down planning method. In the era of BD, massive data can reflect the wishes of the public promote the formation of planning and design values with participants as the main body, combining top-down and bottom-up. In the era of rapid spread of social network, landscape planning and design should build a planning process from planners, designers to the public, then to planning designers, and finally to decision makers.

(3) Promote data fusion
With more and more factors considered in landscape planning, the number and type of relevant data are also increasing. Single consideration of a certain type of data cannot meet the actual needs, which require the use of BD technology, looking for hidden correlation in massive data, comprehensive analysis of different factors, and then put forward countermeasures.

From the analysis results of Figure 1, it can be seen that the standardization, intelligence and scientificity of BD landscape design are superior to traditional landscape design. Part of the landscape design planners in China has more traditional ideas, and it is difficult to give up the traditional ideas. The lack of attention on the investment of new technology has not brought into full play the work efficiency of modern landscape design.

![Figure 1. Comparative analysis on the standardization, intelligence and scientificity of traditional landscape design and BD landscape design](image)

In order to further analyze the application of landscape plant landscaping method in BD application, the results are shown in Figure 2. It can be seen from Figure 2 that after the BD technology is put into use, the satisfaction degree of landscape plant landscaping method has increased year by year. After the introduction of BD technology, landscape plant landscaping method is conducive to avoid one-sided and subjective content in planning, and the effect is also significantly improved. They believe that BD technology has more advantages than disadvantages in the development of landscape plant landscaping method, and that it is necessary to promote BD.
4.2. BD Challenges

(1) Change of thinking planning
Most important opportunity that BD brings to landscape planning is to influence planning thinking, change the traditional planning and design thinking based on experience and sensibility, and let rational thinking enter into the consideration of planning and design. But it is worth noting that we emphasize the importance of data and the relevance of things behind the data. We can't blindly think that data can represent everything.

(2) Data acquisition and analysis
With the development of geographic information technology, we have made gratifying achievements in data acquisition and spatial visualization. However, in the face of complex and dynamic BD, landscape planning lacks corresponding and advanced data processing and analysis methods. Due to the small scope of landscape planning and design, the quality of data needs to be considered, and the research value is often lost due to the low precision or precision. BD has not yet been fully popularized and relevant education and training has not been incorporated into the education system, which is a problem faced by planning and design personnel. Planning based on BD has obvious characteristics in interdisciplinary applications.

(3) Hidden dangers of data utilization
Just from the data itself, we also face many challenges and crises. We can't judge the motives of data collectors, which make data a double-edged sword. If used properly, BD will become a sharp tool for rational decision-making in planning and design; if used improperly, it will cause losses. Therefore, it is particularly urgent to establish a set of standardized and binding BD use system.

Because the amount of data is updated in real time, the time period and division of data collection are also very important, which may affect the final analysis results. Among them, the choice of time cycle also depends on the results of different time periods accumulated by existing relevant theories and experiences. Therefore, how to filter the useless information from the huge database and extract the effective information is a challenging task.

5. Conclusion
In the process of studying the development of BD in landscape plant landscaping method, this paper takes the introduction of BD technology into landscape plant landscaping method as the main line of research. After research, this paper considers that BD technology is an indispensable part of landscape
plant landscaping development. Through the investigation and analysis of different groups of people involved in landscape design, their understanding of landscape plants is obtained. Survey results of the development of BD technology applied in landscape design methods. BD technology gives full play to the advantages of standardization, intelligence and science, and is widely used in various fields of landscape design. Through investigation and analysis, it is concluded that the development of landscape plant landscaping method in BD is conducive to avoid the unilateral and subjective content advantages in planning, and can increase the competitiveness of landscape design. According to the survey results of this paper, in order to make full use of BD technology, it is necessary to integrate BD technology with the actual situation of landscape. Effectively analyze the development process of landscape design under BD technology, attach importance to scientific introduction, and formulate development strategies effectively to ensure the effective development of landscape plant landscaping. This research has achieved ideal results and made contributions to the application of BD in improving the landscape plant landscaping methods.

References

[1] Haaland, C., & Bosch, C. K. V. D. (2015). Challenges and strategies for urban green-space planning in cities undergoing densification: a review. Urban Forestry & Urban Greening, 14(4), 760-771.
[2] Polat, A. T., & Akay, A. (2015). Relationships between the visual preferences of urban recreation area users and various landscape design elements. Urban Forestry & Urban Greening, 14(3), 573-582.
[3] Tariq, S., Jan, F. A., & Ahmad, M. S. (2016). Green employee empowerment: a systematic literature review on state-of-art in green human resource management. Quality & Quantity, 50(1), 237-269.
[4] Ng, W. Y., Chau, C. K., Powell, G., & Leung, T. M. (2015). Preferences for street configuration and street tree planting in urban Hong Kong. Urban Forestry & Urban Greening, 14(1), 30-38.
[5] Schultz, N. L., Reid, N., Lodge, G., & Hunter, J. T. (2015). Broad-scale patterns in plant diversity vary between land uses in a variegated temperate Australian agricultural landscape. Austral Ecology, 39(7), 855-863.
[6] Best, R. B., & Mittal, J. (2015). Free-energy landscape of the gb1 hairpin in all-atom explicit solvent simulations with different force fields: similarities and differences. Proteins-structure Function & Bioinformatics, 79(4), 1318-1328.
[7] Chan, H. S., & Dill, K. A. (2015). Protein folding in the landscape perspective: chevron plots and non-Arrhenius kinetics. Proteins Structure Function & Bioinformatics, 30(1), 2-33.
[8] Schulz, F., & Wiegleb, G. (2015). Development options of natural habitats in a post-mining landscape. Land Degradation & Development, 11(2), 99-110.
[9] Van, D. G. N. C., Stomph, T. J., & De Ridder, N. (2015). Scale effects of Hortonian overland flow and rainfall-runoff dynamics in a west African catena landscape. Hydrological Processes, 14(1), 165-175.
[10] Lyons, E. (2016). Demographic correlates of landscape preference. Environment & Behavior, 15(4), 487-511.