

Research on the Path of Integration and Development of Cultural Tourism Industry Driven by AI Smart Landscape in Liaoning Province

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Abstract: As an important province in the northeast of China, Liaoning Province is rich in natural resources and profound cultural heritage, but it still faces many challenges in the integration and development of cultural tourism industry. This paper deeply discusses the application path of AI smart landscape in the integration and development of cultural tourism industry in Liaoning Province, and analyzes its mechanism in smart landscape design and planning, management and operation, and experience and interaction. The research points out that AI technology can effectively improve the integration depth and service quality of cultural tourism industry in Liaoning Province by building an integrated smart landscape platform, optimizing resource allocation, providing personalized services and innovating tourist experience. However, challenges such as insufficient depth of technology application, uneven regional coordinated development, data islands and privacy protection issues, and shortage of talents still exist. Therefore, this paper puts forward some countermeasures and suggestions, such as strengthening investment in technology research and development, perfecting data sharing mechanism, cultivating compound talents and optimizing service system, in order to provide reference for the high-quality development of cultural tourism industry in Liaoning Province and help it build an internationally competitive cultural tourism destination.

1. Introduction

The integration of AI technology not only brings revolutionary changes to landscape design, planning and management, but also provides tourists with a more personalized and intelligent travel experience [1]. Liaoning Province, as an important province in the northeast of China, is rich in natural resources and profound cultural heritage. In recent years, Liaoning province has made remarkable achievements in the development of cultural tourism industry, but at the same time it is also facing challenges such as how to further promote the deep integration of cultural tourism industry, improve tourism quality and service level. In this context, it is of great significance to explore the application path of AI wisdom landscape in the integration and development of cultural tourism industry in Liaoning Province, which will promote the high-quality development of cultural tourism industry in Liaoning Province.

This study deeply discusses how AI smart landscape drives the integrated development of cultural tourism industry in Liaoning Province, and analyzes its mechanism in improving the level of landscape design, optimizing landscape management and enhancing tourist experience. This study reveals the internal relationship between AI smart landscape and the integrated development of cultural tourism industry, and provides new ideas and methods for the development of cultural tourism industry in Liaoning Province and other parts of the country.

2. The application path of AI smart landscape in the integration of cultural tourism industry in Liaoning Province

2.1. Smart landscape design and planning

The application of AI technology in landscape design greatly revolutionizes the design process,

improves efficiency by automating repetitive tasks such as site analysis and terrain modeling, and enables designers to concentrate more on creative work. Using AI drawing tools, designers can quickly generate sketches, renderings and various design schemes, simplifying operations and reducing labor requirements [2]. AI's data analysis and prediction capabilities help designers better understand environmental conditions, simulate plant growth and environmental impacts, optimize design schemes, and promote the implementation of sustainability and environmental protection measures.

Smart landscape planning integrates technologies such as Internet of Things, cloud computing, big data and artificial intelligence to achieve intelligent management of scenic spots and improve service quality, such as the "one-click tour of Guangxi" platform in Guangxi. It uses digital technology to provide personalized navigation and immersive experiences such as VR and AR, which enhances the sense of participation of tourists and the richness of cultural activities, such as the case of Guanshan Geological Digital Research Museum in Xinxiang City [3-4]. Smart landscape planning promotes the integration of culture and tourism resources, provides personalized services, enhances tourists' experience, and promotes the all-round development of tourism, as shown in the Guangxi Smart Travel Industry Exchange Conference, which reflects its key role in promoting the deep integration of the travel industry and promoting economic development [5].

Therefore, Liaoning Province can learn from successful experience to strengthen technology research and development, and build an integrated intelligent landscape platform to realize intelligent management and service of scenic spots. Liaoning province can integrate rich local historical and cultural elements, and use AI and virtual reality technology to create characteristic cultural tourism projects to enhance the sense of tourists' experience. With the help of data analysis and artificial intelligence to provide personalized services to meet the needs of different tourists and improve satisfaction [6]. Pay attention to the training of AI professionals and industry supervision, ensure the safety of applications and the rights and interests of tourists, and promote the healthy and stable development of smart landscapes.

2.2. Smart landscape management and operation

The application of AI technology in smart landscape management covers three aspects: landscape management and maintenance, intelligent monitoring and data analysis and intelligent decision support (Figure 1). Through the Internet of Things and sensor networks, AI realizes real-time monitoring of the environmental data of scenic spots and accurate maintenance of natural landscapes, and uses computer vision technology to inspect facilities and reduce maintenance costs [7]. With the help of AI algorithm and big data analysis, scenic spots can monitor tourists' traffic and behavior patterns in real time, optimize resource allocation and improve management efficiency, such as avoiding congestion through crowd density prediction [8]. AI provides managers with decision support based on scientific basis through deep mining of the operation data of scenic spots, such as optimizing the layout of scenic spots and the configuration of service facilities according to tourist behavior data.

Smart landscape operation has achieved remarkable results in improving the service quality and tourist experience of the cultural tourism industry through the application of AI technology. Intelligent tour guide system uses AI to provide customized itinerary planning and multilingual explanation services for tourists, such as AI customer service and virtual tour guide functions provided by Shenyang's "Easy Tour Shenyang" platform plan, which realizes personalized travel experience. AR/VR technology creates an immersive experience, allowing visitors to experience virtual historical scenes or cultural stories in scenic spots. For example, the Shenyang Forbidden City uses 4D technology to dynamically display historical stories, which greatly enhances the cultural experience of tourists.

In terms of improving operational efficiency, AI technology improves marketing conversion rate through precise marketing and personalized recommendation, and improves tourists' satisfaction through real-time response to tourists' consultation and emergency handling in emergencies. AI technology also optimizes the allocation of resources, and reduces the waste of resources by

regulating the traffic flow and the distribution of tourists in the scenic spot through intelligent systems [9]. Cultural heritage protection also benefits from AI technology. Digital twin technology is used for high-precision restoration and virtual display of cultural heritage, which not only protects cultural relics, but also enhances the viewing experience.

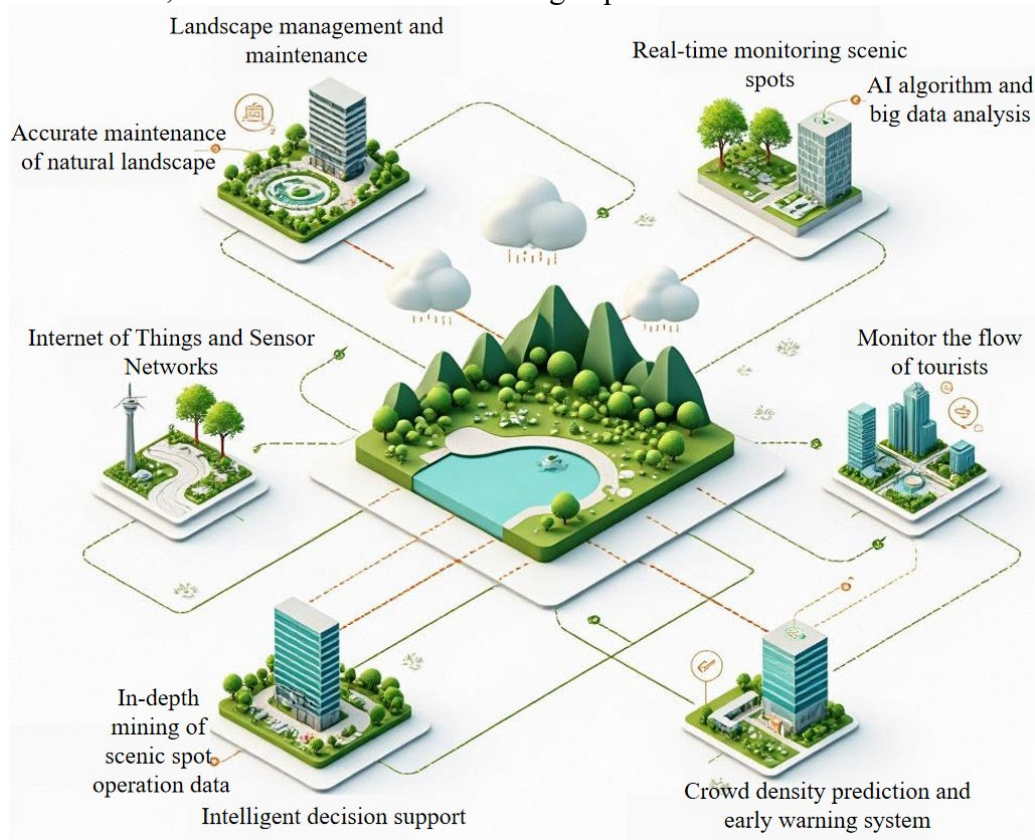


Figure 1 Application of AI technology in smart landscape management

2.3. Smart landscape experience and interaction

AI Smart Landscape greatly enhances the tourist experience through innovative experience and personalized service. Using AR, VR and other technologies, visitors can get an immersive landscape experience, such as seeing virtual historical figures or scenes merge with the real landscape through AR glasses, increasing interest and interactivity. With the help of big data to analyze tourists' behaviors and preferences, the intelligent tour guide system can provide customized tour routes and services, and equipped with AI tour guides and virtual digital people to respond to tourists' needs in real time, further enhancing the personalization and satisfaction of the tour.

Smart landscape enhances visitors' sense of participation and satisfaction through interactive games and social media sharing. Liaoning province can use AI technology to design interactive games and challenges, such as treasure hunting games and knowledge quiz, so that tourists can actively participate in the process of playing and enhance the sense of experience. Encourage tourists to share their experiences through social media. AI technology can automatically generate interesting pictures, videos or copywriting, which is convenient for tourists to share quickly, which not only increases the exposure of scenic spots, but also promotes word-of-mouth communication.

3. Challenges and countermeasures

3.1. Challenges faced

The application of AI technology in the cultural tourism industry faces multiple challenges (Figure 2). The problem of superficial and insufficient depth of technology application is more prominent. The intelligent navigation system in many scenic spots has a single function and fails to

fully integrate the individual needs of tourists, resulting in poor user experience. There is a regional imbalance in the development of smart tourism in Liaoning Province. The technology application in Shenyang, Dalian and other cities is relatively mature, while other regions are relatively backward. In addition, the cultural tourism resources are scattered and the cross-regional coordinated development mechanism is not perfect, which makes it difficult to form scale effect.

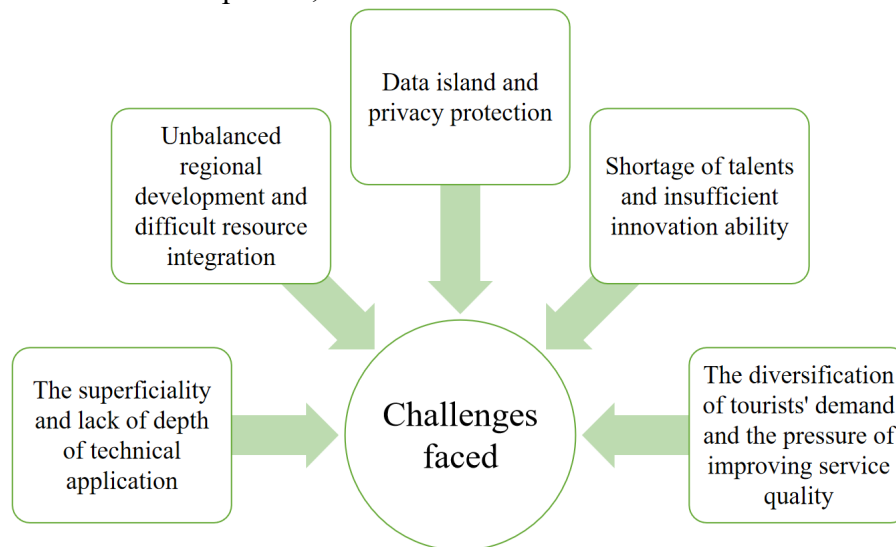


Figure 2 AI wisdom landscape drives the challenge of the integration and development of cultural tourism industry in Liaoning Province

Data silos and privacy protection issues also pose major challenges. The imperfect data sharing mechanism between scenic spots and platforms limits the effective application of AI technology, and the protection of tourists' privacy needs to find a balance between data utilization and privacy protection. The shortage of talents and the lack of innovation ability also restrict the development of the industry. The shortage of compound talents affects technology research and development and operation management, and hinders the pace of technological innovation and industrial upgrading. Facing the increasing diversified demands of tourists, how to achieve accurate service and improve service quality and efficiency through AI technology has become an urgent problem for cultural tourism enterprises.

3.2. Countermeasure and suggestion

In order to deepen the application of AI technology in the cultural tourism industry, Liaoning Province should strengthen its deep integration with cultural tourism scenes and develop functions such as intelligent navigation, AR/VR immersive experience and personalized itinerary planning to enhance the tourist experience. Liaoning Province should encourage enterprises to increase investment in technology research and development, especially in innovative applications in the fields of cultural activation and precision marketing. In addition, we should establish a unified platform for cultural tourism in the whole province, integrate cultural tourism resources in various regions, break the data island, realize resource sharing and coordinated development, and promote the common development of surrounding areas by promoting the construction of cultural tourism industry alliance in Shenyang modern metropolitan area [10].

In terms of data governance and privacy protection, it is necessary to formulate data sharing standards for cultural tourism to ensure the efficient use of data, and at the same time, adopt encryption technology and anonymous processing to strengthen privacy protection. In view of the shortage of talents, universities and enterprises should cooperate to offer courses related to the integration of AI and cultural tourism to cultivate compound talents, and at the same time, enterprises should also carry out training to improve employees' digital skills and innovation ability. In the aspect of optimizing the service system, personalized service is provided by building portraits of tourists, and AI technology is used to improve links such as tourist connection and ticket management, so as to improve the overall service efficiency and tourist satisfaction.

AI smart landscape provides new opportunities for the integration and development of cultural tourism industry in Liaoning Province, but it also faces many challenges such as technology application, regional coordination, data governance and so on. By deepening the application of technology, improving the coordination mechanism, strengthening data governance, cultivating compound talents and optimizing the service system, Liaoning Province can give full play to the potential of AI technology, promote the high-quality development of the cultural tourism industry, and build an internationally competitive cultural tourism destination.

4. Conclusion

It is found that through intelligent landscape design and planning, AI technology can innovate the design process, improve the design efficiency and promote the implementation of sustainability and environmental protection measures. In terms of intelligent landscape management and operation, the application of AI technology has realized the intelligent management of scenic spots and the improvement of service quality, such as providing personalized and immersive travel experience for tourists through intelligent navigation system and AR/VR technology. However, the research also pointed out the challenges faced by the application of AI technology, including the superficial and insufficient depth of technology application, the imbalance of regional development, data islands and privacy protection issues, and the shortage of talents and innovation ability. In view of these challenges, the study puts forward corresponding countermeasures and suggestions, such as strengthening technology research and development, establishing a unified platform for intelligent travel in the province, formulating data sharing standards, and cultivating compound talents. AI smart landscape provides new opportunities for the integration and development of cultural tourism industry in Liaoning Province, but it also faces multiple challenges. By deepening the application of technology, improving the coordination mechanism, strengthening data governance, cultivating compound talents and optimizing the service system, Liaoning Province can give full play to the potential of AI technology, promote the high-quality development of the cultural tourism industry, and build an internationally competitive cultural tourism destination.

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