Research on Intelligent Platform of Equestrian Complex Construction Based on Intelligent Sensor Network

Zhengyi Zhang, Yaonan Li[*], Wansheng Huang

（School of Physical Education and International Equestrianism, Wuhan Business University, Wuhan, Hubei, 430056, China)

13476228180@163.com

Abstract. With the continuous improvement of people's living standards, equestrian sports have gradually entered people's field of vision. Equestrian sports, as a sport with great ornamental and competitive value, can not only provide high-quality sports services, but also create more employment opportunities for the city. This paper analyzes the present situation of equestrian venue complex construction in China. Aiming at the existing problems, an intelligent platform of equestrian venue complex is built based on intelligent sensor network, aiming at realizing data resource sharing, interconnection, remote management and big data analysis of equestrian venue complex, and providing data support and decision-making basis for equestrian venue complex construction.

Keywords: Internet; Intelligent platform; Equestrian venue

1 Introduction

At present, the number of equestrian venue complexes in China is increasing gradually, but most equestrian venue complexes are in a state of "going it alone", mainly focusing on venue construction, lacking understanding and planning of equestrian sports and related industries. The existing equestrian venue complexes in China are mostly concentrated in sports centers or parks, and the number is small. In addition, influenced by factors such as site area and land nature, there are great differences in the construction of equestrian venue complexes in different regions[1]. According to relevant surveys, there are the following problems in the construction of equestrian venue complex in China: First, due to the lack of understanding and planning of equestrian sports and industry, the venue location is inappropriate; Second, the facilities of some equestrian venues are not perfect; Third, the lack of daily maintenance and management of the site; Fourth, there is a lack of training and introduction of professionals. These problems hinder the development of equestrian industry in China. With the rapid development of equestrian sports in China, it is urgent to strengthen the planning and management of equestrian venue complex construction. This paper puts forward an intelligent platform of equestrian venue complex based on intelligent sensor network,

aiming at providing data support and decision-making basis for the development of equestrian industry in China[2-3].

2 Internet of Things and Smart Tourism

2.1 Smart Tourism and Its Architecture

The so-called smart tourism is to integrate the Internet of Things with the tourism industry. Through the Internet of Things, tourism professionals and consumers can avoid the differences in time and space, feel, touch and know all the tourism elements face to face, highlight the central role of experience and interaction in tourism, enjoy personalized quality services, and make tourism easily available, free-spirited and relaxed. The application of Internet of Things technology in tourism provides conditions for the timely integration of the ever-increasing demand for tourism services and the growing tourism products[4]. Cloud computing can display an endless stream of massive tourism information in the cloud computer center through various sensors, networks and other devices, which is convenient for tourism enterprises and consumers to use with high efficiency and low cost; Portable electronic terminals such as smart phones and tablet computers provide carriers for the intelligent presentation of tourism resources information in cloud computing centers. The national policy promotion of Internet of Things technology and the demand for tourism information services provide a solid guarantee for the wisdom of tourism. The function of smart tourism architecture is bidirectional (see Figure 1). The sensor transmits the collected tourism information to the network for statistics through digital conversion of gateways and base stations in the access layer, and the tourism subject can easily obtain the tourism information analyzed and counted by the Internet layer on terminal devices such as mobile phones, tablet computers and WiFi. Tourism subjects can also put forward and get the expected tourism data and information through a series of framework carriers according to their own needs[5].
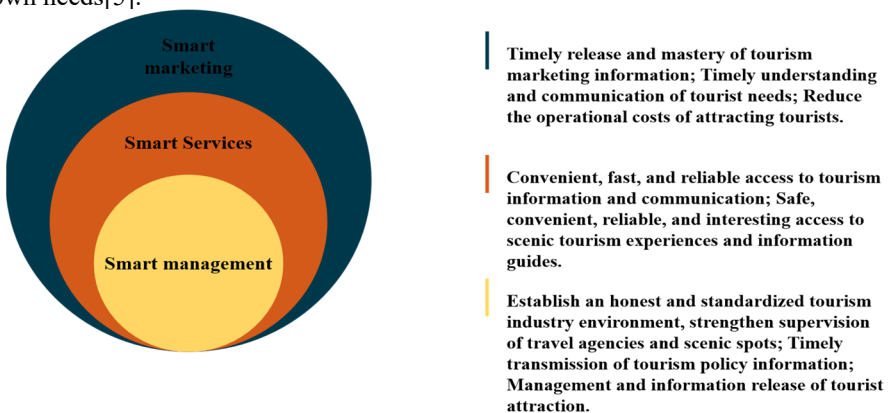

Fig. 1. Smart tourism architecture

3   Intelligent scene of complex based on Internet of Things platform

In the past, functional phones became smart phones with operating systems such as IOS and Android, which opened the era of mobile Internet. When the Internet of Things platform is applied to the urban complex, there will be an "intelligent operating system". In the era of intelligence, the project is no longer just pursuing the function superposition of a single system as in the past, but based on the Internet of Things platform and ecological chain, more and more intelligent scene applications are selected for the complex as needed, and it has strong and flexible configuration and expansion capabilities. Here are some relatively mature intelligent scenes[6].

3.1   Intelligent operation

In the design, we should analyze the later operation needs, design and build passenger flow analysis, parking lot classification, energy efficiency management, information release, indoor navigation and shopping guide in advance, so as to improve the intelligent level of operation and avoid later transformation or repeated construction[7].

3.2   City-level overall operation

Stand in the height of the whole city and plan operational assets as a whole to improve the utilization rate of resources. Shared parking spaces can be designed to realize staggered parking between residential areas and office areas; Coordinate the design of intelligent advertising equipment to enhance the competitiveness of rent negotiation; Planning shared offices, conference areas and other open and flexible operations for the society.

3.3   Unified membership system

Through the Internet of Things platform, the commercial membership system and property management, leasing, wine management and other systems of the complex can be opened to provide unified big member data. Commercial operations can continuously obtain accurate customer information from other systems, and customers can also obtain unified VIP membership services throughout the city[8].

3.4   Digital Operation

By integrating system data such as CRM, sales and operation, passenger flow and vehicle flow through the Internet of Things platform, a big data analysis platform can be established, which can flexibly drill and analyze data according to operational needs and realize accurate marketing, service and decision-making.

3.5   Smart Security

Design an overall intelligent security system for the complex, and conduct comprehensive monitoring through panoramic monitoring of commanding heights and drones; Reasonable design of video intelligent analysis functions such as cross-border monitoring, violation monitoring, high-altitude parabolic, face recognition, etc. to upgrade traditional civil air defense, and manage and operate it based on a unified security platform.

3.6   Smart Operation and Maintenance

The running status of electromechanical, lighting, elevator, intelligent, fire-fighting and other equipment is monitored in real time by sensors, and alarm is given when it exceeds the set threshold, and it is linked with the work order system and equipment ledger to realize intelligent closed-loop management of all equipment operation and maintenance.

3.7   Intelligent Transportation

Upgrade parking lot management to intelligent transportation, and coordinate the management of parking space resources and charging rules in the region; Set up centralized seats to realize more unattended parking lots; And the introduction of illegal parking monitoring, traffic information screen and so on to maintain traffic order[9].

3.8   Integrated Management Platform

Provide a unified and efficient management tool for the on-site management of the complex. Through the Internet of Things platform, all isolated intelligent subsystems can be connected and integrated as needed. The management can monitor and set the operation of all equipment in a unified way on the management platform, so that the whole complex can run intelligently according to the preset, and intelligently dispatch and handle abnormal events such as alarms.

4   Data analysis platform design

The design of data analysis platform mainly includes two parts: one is to collect the data of equestrian venue complex, and the other is to analyze and process the collected data. In the equestrian venue complex, all equipment is connected with the data acquisition module. According to the actual demand, through the data processing, the overall running state of equestrian venue complex can be obtained.

The data analysis platform adopts B/S architecture, and users can directly access the data analysis platform through the browser or APP. By dynamically responding to the user interface, the page jump function can be realized, and the operation is more convenient and faster. Users can also remotely control and manage the equestrian venue

complex through the background management module. The data analysis platform has the following functions: firstly, the running state of equestrian venue complex is statistically analyzed according to the actual demand; The second is to comprehensively evaluate the equestrian venue complex.

By integrating Internet of Things technology, computer technology, network technology and mobile Internet technology, this study builds an intelligent platform for equestrian venue complex, and realizes the information and intelligent management of equestrian venue complex. The application of the platform has solved the problems such as insufficient resource sharing, inefficient operation and management, and difficult operation and management in the process of equestrian venue complex construction, and promoted the construction and development of equestrian venue complex[10].

The construction of intelligent equestrian venue platform in A city has both municipal platforms and district platforms, forming a "1+10" equestrian venue platform system, that is, one municipal intelligent equestrian venue platform +10 district sub-platforms. All sources of construction funds are financial funds. From the perspective of municipal platforms, the investment is divided into three years, with an annual investment of about 17.5 million yuan and a total investment of more than 50 million yuan. The investment estimate includes the construction project costs such as application system transformation and application system deployment, software and hardware purchase costs, application system development project costs, other project construction costs and preparation costs. The expenses are mainly invested as shown in Table 1.

Table 1. Table of funding investment situation of smart economic service platform in 2017

Classi-fication	To tal	Financial fund input (ten thousand yuan)										
		Construction project fee				Software and hardware purchase fee			Application system devel-opment		Investment in infor-mation infrastruc-ture	
		Applica-tion system trans-for-mation	Per-son-nel funds	Application system deployment		Among			Among			
				Among		Soft ware pur-chase fee	Hard ware pur-chase fee	Fabri-cating cost	Proj ect fun ds	Infra-struc-ture costs	The num ber of start s this year	Bu ilt thi s ye ar
				Stand-ardiza-tion construc-tion	infor-mation con-struc-tion							
City level	17 50	50	200	150	100	250	400	150	100	100	50	20 0

In addition to solving the problem of permission, we must also see whether it is attractive to investors. According to the forecast of Forward-looking Industry Research Institute, the scale of China's smart tourism market has exceeded 6 trillion yuan in 2022, and the compound annual growth rate will be about 32.64% in the next five years (2022-2026). By 2026, the scale of China's smart tourism market will reach 18.7 trillion

yuan. By 2025, there will be 40-80 billion devices connected to the Internet of Things in the world, and there will be more than 7 billion devices related to government management, most of which will come from the connection demand of smart tourism (Figure 2).
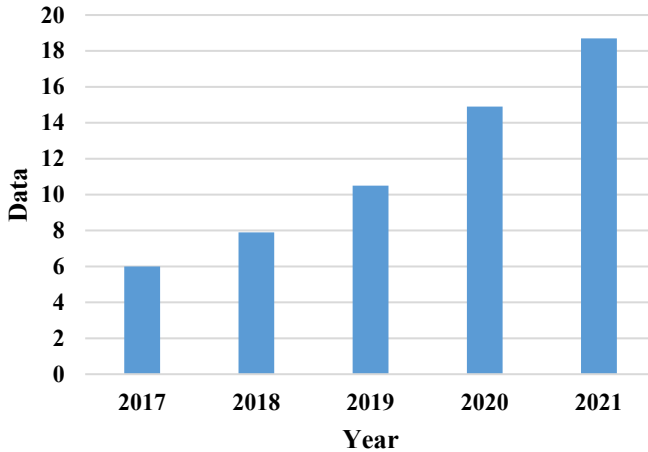

Fig. 2. Trend of Market Size Change of Smart Cities in Five Years

5   Conclusion

In recent years, the development of equestrian sports in China has reached a certain scale, but the construction of venue complexes is relatively backward. Most equestrian venue complexes have problems such as lack of unified planning, unclear positioning, imperfect management system and lack of unified management. Under the background of smart city and Internet of Things construction, in order to solve the problems existing in the construction of equestrian venue complex in China, this paper constructs an intelligent platform of equestrian venue complex based on smart sensor network, which realizes the sharing, interconnection, remote management and big data analysis of equestrian venue complex, and provides data support and decision-making basis for the construction of equestrian venue complex. In the future, we can improve the function of the intelligent platform of equestrian venue complex by introducing AI technology, Internet of Things technology and other technical means, and improve the information level of equestrian venue complex.

Acknowledgements

References

1. Feng, L. , & Zhao, J. . (2021). Research on the construction of intelligent management platform of garden landscape environment system based on remote sensing images. Arabian Journal of Geosciences, 14(14), 1-19.
2. Chen, Y. , & Tang, Z. . (2021). Research on the construction of intelligent community emergency service platform based on convolutional neural network. Scientific programming,5(14), 2021.
3. Liu, Y. . (2021). Intelligent analysis platform of agricultural sustainable development based on the internet of things and machine learning. Acta Agriculturae Scandinavica, Section B - Soil & Plant Science(1), 1-14.
4. Jia, R. . (2021). Design of a simulation platform for intelligent marine search and rescue based on wireless sensors. Microprocessors and Microsystems, 8(10), 103572.
5. Wang, X. , Xu, X. , Zhang, J. , Zhu, Y. , Fan, Y. , & Xu, P. . (2021). Research on intelligent construction algorithm of subject knowledge thesaurus based on literature resources. Journal of Physics: Conference Series, 1955(1), 012038 (10pp).
6. Liu, L. , & Tsai, S. B. . (2021). Intelligent recognition and teaching of english fuzzy texts based on fuzzy computing and big data. Wireless Communications and Mobile Computing, 2021(1), 1-10.
7. Wang, J. , & Jahng, S. G. . (2021). Research on local feature intelligent extraction algorithm of blurred image under complex illumination conditions. IEEE Access, 2(99), 1-1.
8. Feng, L. , & Zhao, J. . (2022). Retraction note to: research on the construction of intelligent management platform of garden landscape environment system based on remote sensing images. Arabian Journal of Geosciences, 15(1), 1-1.
9. Chen, Y. , & Liang, H. . (2021). Research on the construction of rural complex in the context of rural revitalization based on fahp. Journal of Intelligent and Fuzzy Systems,2(3), 1-10.
10. Huang, Z. , Yang, Y. , Gao, J. , & Wang, K. . (2021). Research on intelligent cloud test platform. Journal of Physics: Conference Series, 1756(1), 012003 (9pp).