

Research on Public Service System of Intelligent Tourism Based on Optimization Theory

Xiaoying Long^{a,*}, Hongxia Wu^b

Aviation Tourism Department, Sichuan Science and Technology Vocational College, Chengdu, Sichuan, China

^a825182196@qq.com, ^b929896391@qq.com

*Corresponding author

Keywords: Big Data, Smart Tourism, Platform Operation, The System Design

Abstract: Against the wisdom tourism public service system construction exists in the lack of system integration idea, insufficient capital investment, public information service level is not high, construction problems such as imbalance, according to the wisdom of tourism related theory, using multivariate optimization calculation method, artificial intelligence algorithm, according to the tourist demand, establish the public service system, construction of whole tourism media information release platform, Build a mobile APP platform integrating provincial tourism resources, innovate the tourism network marketing model, establish a reasonable interactive evaluation and feedback mechanism for public services, carry out the construction of smart tourism scenic spots, build a security system for public service tourists, and build a tourism e-commerce platform.

1. Introduction

The emerging smart tourism public service system, as the product of the combination of artificial intelligence technology and tourism public service system, needs to be optimized and improved to solve the problems of low awareness and unbalanced construction. It is necessary to further study the public service system of smart tourism, find out the problems of hardware and software, and improve the level of public service of tourism.

In foreign countries, information technology has been applied to tourism. Ulrike Gretzel, from the perspective of technology and social science, believes that intelligent tourism system can provide tourists and service providers with better relevant information, decision-making help and stronger mobility, enabling tourists to obtain better and more tourism experience [1]. Rudas and Fodor proposed that intelligence is a quick, timely and successful response to the requirements of a new situation. It can acquire knowledge by understanding and absorbing relevant experience[2].

Jin Weidong introduced nanjing's practice plan of smart tourism public service system, and pointed out that the system should be built around serving tourists and management [3]. Zhang ly think wisdom tourist target, is to realize the personalization of tourists, provide enterprises with services, to realize the seamless integration of public service and public management these three aspects [4]; haiyan qiao analyses the tourism information indicating, consulting, transportation and public information platform of the four systems constitute the wisdom tourism public information service system [5].

At present, smart tourism in China has not been truly intelligent, and the platform construction is just emerging, which needs a lot of exploration and improvement. From the perspective of the needs of tourists, this paper will apply new ideas, new technologies and new ways to solve the new problems in the development of tourism, and put forward suggestions on the construction of smart tourism public service system to meet the new needs of different application subjects.

2. The Theory of Intelligent Tourism Public Service

2.1. Overview of Smart Tourism

Intelligent tourism is a form of tourism that responds intelligently to the needs of activities in the process of tourism according to scientific concepts, satisfies the personalized needs of tourists, improves the economic benefits of tourism enterprises and enhances the level of tourism administrative supervision, and realizes the mutual sharing and effective use of various resources. The core of wisdom is to perceive different needs of users and provide correct and reasonable feedback. The basic construction of this ability requires big data analysis of tourism information to provide targeted information feedback for the government, tourists and enterprise managers. For tourists, the construction of smart tourism needs to keep abreast of their changing needs. A tourism public service platform based on Internet of Things, Internet, mobile communication and other technologies should be established to provide integrated and whole-process tourism dynamic information, wireless Internet environment, payment platform, complaint, evaluation, suggestion channel and other systems.

Wisdom construction ultimate goal is application of a new way of tourism, new ideas and new technology to solve new problems in tourism development, to meet the new requirements of different application subject, therefore, wisdom tourism research from the perspective of demand and various application entities to explore the scientific and reasonable the wisdom of the tourism system, realizes the government, tourists, enterprise H coexistence and win-win. Smart tourism realizes the optimization of tourism information system, making people and things in the process of tourism more intelligent, more coordinated, more perfect and more convenient.

2.2. AIT(artificial intelligence technology)

Artificial intelligence technology is a new technical science to research and develop the theory, method, technology and application system for simulating, extending and expanding human intelligence. It is a theory and technology that studies how to use computer hardware and software to simulate human intelligent behavior and explore its rules. It is widely used in many fields such as data mining, information search, simulation system, robot, decision support and control system.

In intelligent tourism, the main application of artificial intelligence technology; To effectively collect, store, process and integrate massive tourism information resources, so as to improve service efficiency and quality, and bring more efficient, convenient and personalized tourism experience for tourists. For tourists, ARTIFICIAL intelligence technology is more used to forecast tourism demand, carry out personalized analysis on tourists, and recommend the most suitable scenic spot information and transportation route to tourists according to their situation.

2.3. Multivariable Optimization Algorithm

It is necessary to analyze objective function in a simple and uniform way. To use simple function to approximate complex function optimally, we need to select the approximate function and study the error.

Definition of optimal approximation: let x_1, x_2, \dots, x_n is n linearly independent members of the inner product space U. Its generating space is M, denoted as: $M = \text{span} \{x_1, x_2, \dots, x_n\}$. $x \in U$. For any element of U, find a set of numbers a_1, a_2, \dots, a_n ,

$$\left\| x - \sum_{i=1}^n a_i^* x_i \right\| \leq \left\| x - \sum_{i=1}^n a_i x_i \right\|$$

Where $\sum_{i=1}^n a_i x_i$ is any element in M. $x_0 = \sum_{i=1}^n a_i^* x_i$ is called the optimal approximation functional in M. The problem of finding the optimal approximation element is the problem of finding the projection. Equations are established according to the projection properties of inner product space:

$$\left(\sum_{i=1}^n a_i^* x_i, x_j \right) = (x, x_j) \quad (j=0,1,2,\dots,n)$$

$D_i(i=1,2,3,\dots,n)$ is to replace the element in the i th column of the determinant of the coefficient with the constant term of the system, so the above equation can be solved. Thus the best approximation element of X in M can be found. In particular, when x_1, x_2, \dots, x_n is the canonical orthogonal system, then simplified to $a_i^* = (x, x_i)$, and It is called the generalized Fourier coefficients of X .

2.4. Overview of Smart Tourism Public Service System

Public goods have the characteristics of non-exclusive and non-competitive consumption. It refers to a kind of public goods that will not reduce the consumption of the product by others. The public goods are generally provided by the government, and the public goods theory has a certain reference role for the study of the public service system of smart tourism. Public service refers to the general term of the public goods provided by the government to meet the public needs of the society. It is divided into public engineering construction, public transportation service, public safety service, human health and social service, culture and leisure service, support service and public facilities. It has the characteristics of fairness and public welfare.

Smart tourism public services refer to tourism services and public products provided by the government and other social organizations to tourists, tourism enterprises, tourism associations, media and local residents. Smart tourism public service provider, government as the leading, other organizations or individuals participate. The smart tourism public service system focuses on how to provide smart tourism services to demand objects, including supply mode, policy support and guarantee mechanism.

2.5. The Public Service System of Smart Tourism is Mainly Supported by Technology

Information is the core content of smart tourism. The development of smart tourism needs the support of information technology, and the construction of smart tourism public service system needs the support of information technology. The collected information is exchanged to realize the identification, monitoring, tracking, positioning, communication and management of the network system between people and things.

Cloud computing technology refers to an information processing method that organizes and calls all kinds of information resources uniformly through network means to realize large-scale computing, and provides the required services for users in a dynamic demand and measurable way. Tourists can obtain the information and communication resources and services they need through network.

Artificial intelligence technology refers to a theory and technology that studies how to use computer hardware and software to simulate human intelligent behavior and explore its rules. It is applied in data mining, information search, simulation system and robot. The value of the application of big data in smart tourism; Cloud database construction to prepare for the application of big data and mobile Internet era; Integrate information collection, analysis and redistribution, optimize internal resources; Grasp the potential crisis in the first time and resolve the crisis; Strengthen the tourist experience, enhance the reputation of tourism; Establish and maintain overseas social media accounts to enhance the popularity of tourism and obtain overseas tourists; For online marketing, advertising, provide accurate direction reference, improve the work effect, cost saving.

3. Analysis on The Problems of Colleges and Universities Serving Regional Economy

3.1. Analysis of Tourists' Satisfaction with Smart Tourism Public Services

In order to understand the public's awareness of smart tourism, the questionnaire design mainly includes two parts: one is the statistical characteristics of People's Daily, which mainly includes the

gender, age, occupation, education level, income level, tourist source and tourism mode of the interviewed tourists; Second, tourists' satisfaction with smart tourism public services, including 25 items from 4 aspects: mobile terminal equipment usage habits, tourism information acquisition methods, smart tourism understanding degree, and smart tourism service platform satisfaction; Finally, we seek suggestions from tourists to promote public services of smart tourism, and understand the needs and concerns of tourists.

The survey shows that TV advertising and online media are still the most important ways for tourists to get tourism information, accounting for 34.3% and 32.4%, followed by introductions for relatives and friends, accounting for 11.6%. The number of users of promotional activities, tourism information consultation phone, and tourism information touch screen is less. Tourists' demand for smart tourism information mainly includes: portal website, mobile WAP website, mobile APP, scanning two-dimensional code, LED display screen, etc.

In the survey of satisfaction with the self-service travel system, 10.3% of the respondents were satisfied. After arriving at the scenic spot, tourists urgently need to quickly and intelligently understand the relevant tourist guide and shopping guide information; 11.4% of the respondents are satisfied with the help of shopping guides and hope to have channels to ensure the quality of travel shopping. In terms of complaints and satisfaction with improved tourism quality, 15.3 percent said they were satisfied.

Smart tourism ensures that tourism complaints can be effectively solved through the construction of tourism advisory and complaint service hotline and tourism advisory service platform; In terms of the satisfaction degree of the navigation map in the process of tourism, 14.7% were satisfied, and the overall satisfaction degree was 3.65%.

3.2. Problems Existing in The Construction of Smart Tourism Public Service System

The construction of smart tourism involves many links, industries and departments of tourism development, and the main problems are as follows:

Lack of system integration and collaboration. The construction of the public service system of smart tourism involves a wide range of areas, is comprehensive and has certain complexity. It needs to cooperate with relevant departments such as information, transportation, publicity, construction, planning, health, public security, industry and commerce, quality supervision, culture, statistics, banking and prices.

Lack of standards, evaluation system. At present, the corresponding standardization work of smart tourism has not been carried out, the standard system of smart tourism has not been established, some key standards are missing, and the standardization work has many overlapping and duplication.

There is insufficient funding. Although the investment in smart tourism construction has increased, compared with tourism market development and publicity and marketing expenses, the investment in infrastructure with the nature of public services is not enough. As a result, the hardware conditions of the public service system cannot keep up with the progress of application software development, resulting in some application tourists unable to use it.

The level of public information services needs to be improved. The awareness of smart tourism public service is low. The foundation of informatization is relatively weak. It is not clear how to build and how to develop.

Regional development of the public service system is uneven. In different regions, due to different levels of economic development, the construction of several smart tourism pilot cities and municipalities is not balanced.

4. Countermeasures to Promote the Construction of Intelligent Tourism System

4.1. Ideas on Promoting the Construction of Smart Tourism Public Service system

By referring to the relevant achievements of domestic and foreign smart tourism public service system on tourist demand and taking sichuan's smart tourism public service system as the research

object, this paper analyzes and summarizes the current situation and shortcomings of smart tourism public service system construction, and puts forward countermeasures and suggestions for the construction and development of smart tourism public service system. In order to achieve the wisdom tourism public service system construction, improve the tourist satisfaction, not only to build successful experience at home and abroad for reference, also need to combined with the wisdom of tourism local public service development present situation, problems and the actual demand of tourists, targeted to take preventive measures and solutions, and the wisdom tourism public service system construction, and achieve the desired effect.

4.2. Countermeasures to Promote the Construction of Smart Tourism Public Service System

Establish a public service system based on the needs of tourists. The planning and construction of smart tourism public service system must aim at meeting the needs of tourists and improving the tourism experience. At the present stage, the planning and construction of smart tourism public service is tourist-centered, and the primary goal of the development of smart tourism public service system is to improve the content of tourism information service and improve the quality of tourism service.

We will improve it infrastructure. Smart tourism is not a complete replacement of traditional tourism infrastructure, but to realize the wisdom of tourism infrastructure by adding the ability of intelligent perception and interactive judgment to traditional tourism infrastructure.

We will build a tourism all-media information release platform. Through the construction of cloud data center, and the corresponding tourism industry data resources collection, exchange, sharing service standards or normative system. Construction of provincial tourism resources of mobile APP platform, the use of smartphones as a carrier, terminal development for 3 g / 4 g mobile communication and WIFI network of handheld digital guide APP, management and marketing system, the system is geared to the needs of tourists from the real-time travel services, providing digital mobile management in the scenic spot, market oriented to national and global mobile marketing quickly.

Build a mobile APP platform integrating provincial tourism resources. Smart phone has become the main carrier of today's social network, using smart phone as the terminal carrier, the development of "3G/4G mobile communication and WIFI network handheld digital tour guide, management, marketing system, the system for tourists to provide real-time tourism services, for the scenic area to provide digital mobile management, Carry out rapid mobile marketing nationwide and even globally for the market. Realize the integration of tourism resources and information in the whole province, and provide a real-time mobile platform for regional tourism information release and unified marketing of resources

We will strengthen market promotion and publicity of the public service system for smart tourism. Smart tourism is to enable tourists to have comprehensive, intuitive and in-depth travel experience and interact with the network in real time with the help of virtual auxiliary system. The smart tourism experience center will be established to provide free experience of smart tourism products for all residents and tourists, so that residents and tourists can feel the convenience brought by the era of smart tourism, improve the awareness, attention and participation of smart tourism public service system, and further strengthen the promotion of smart tourism.

Establish a reasonable interactive evaluation feedback mechanism for tourists. The establishment of reasonable appraisal feedback mechanism can effectively control the wisdom tourism public service system construction, and the tourists as the main body in the service object, comments and proposals for construction effect and level, can make policymakers can grasp well the wisdom tourism public service the level, and find out the shortcomings, in a timely and effective manner to improve and perfect, to ensure that meet the demand of tourists changing experience.

To carry out the construction of smart tourist attractions, promote the combination of the Internet and traditional tourist attractions, build an electronic ticket reservation system, learn from the successful experience of major tourism network platforms at home and abroad, and provide a wide range of online marketing and promotion channels for tourist attractions. Promote the full coverage

of intelligent tour guides, electronic explanations and other functions in scenic spots, improve the management efficiency of scenic spots, enhance the overall informatization marketing level of the traditional tourism industry in Our province, and provide convenient services for tourists.

Build an e-commerce platform for tourism. The certification system for tourist products has not really been established. To adapt to the changes in tourists' behavior, build an e-commerce platform that truly serves tourists, and use weibo, wechat and other emerging information media platforms to promote, carry out accurate marketing, constantly optimize consumption experience, and promote the deep integration of online and offline.

5. Conclusion

Related connotations of smart tourism: The construction of smart tourism is the application of new ways, new ideas and new technologies to solve the new problems in the development of tourism, to meet the new needs of different application subjects, and is the combination of new technology and new tourism.

This paper studies and analyzes the advanced experience in the construction of smart tourism public service system at home and abroad, summarizes the previous research results, analyzes the problems existing in the tourism market, and proposes the content, construction framework, demand characteristics, supply characteristics and key technologies applied in the smart tourism public service system.

The current situation and existing problems of smart tourism construction are analyzed, including lack of systematic integration ideas and cooperation, lack of standard evaluation system, insufficient capital investment, public information service level to be improved, low awareness of smart tourism public service, unbalanced construction and other problems.

Understand the needs of tourists, conduct statistical analysis on the public service system of smart tourism, and comprehensively understand the awareness, satisfaction and demand characteristics of tourists on the public service system of smart tourism.

Based on the theory and experience summary, combined with the survey results, this paper puts forward countermeasures and suggestions to promote the construction of smart tourism public service system, which has certain practical reference significance.

Acknowledgements

The authors greatly appreciate the following sponsors for their support to the study: Soft Science Project of Science and Technology Department of Sichuan Province, "Intelligent NUMERICAL control system based on physical motion control principle" 22RCYJ0005.

References

- [1] Gretzel,U.(2011).Intelligent Systems In Tourism[J]: A Social Science Perspective Annals of Tourism Research,2011,38(3):757-779.
- [2] Rudas, I. J., Fodor,J. (2008). Intelligent Systems[J]. International Journal of Computers Communication&Control, III(Suppl):132-138.
- [3] Jin Weidong. Smart tourism and the construction of tourism public service system [J]. Tourism Tribune, 2012(2) :5-6.
- [4] Zhang Lingyun. Smart tourism: The coming of the Era of personalized Customization and Intelligent Public Service [J]. Tourism Tribune, 2012(2) :3-5.
- [5] Qiao Haiyan. Reflections on the construction of tourism public information service system [J]. Journal of Central South University of Forestry and Technology, 2012, 6(2) :27-29.