Global Economic Perspectives Vol 2 Issue 2 2024

Original Research Article

Open Access

Omniscient Pte.Ltd.

Tourist Attractions Guide Digital Person Intelligent Recommendation and Customized Itinerary Innovative Exploration of Planning

Ya-Wen Zhang, Mao-Zheng Fu*, Yi-Yun Zhang, Rui Dou, Tian-Hui Peng, Si-Si Feng

Hainan Vocational University of Science and Technology, Haikou, Hainan, 571126, China

***Correspondence to:** Maozheng Fu, Hainan Vocational University of Science and Technology, Haikou, Hainan, 571126, China, E-mail: 279133771@qq.com.

Project Fund: 2023 Hainan Provincial College Students Innovation and Entrepreneurship Training

Project: Intelligent recommendation and customized itinerary planning for digital tour guides in tourist attractions(S202314172002).Research on the value evaluation and innovative utilization path of rural tourism development under the background of smart tourism of The Business and Tourism Research Base Project of Hainan Free Trade Port (HKKY2022-06).

Abstract: With the rapid development of information technology and the promotion of digital transformation, the traditional tourism industry is facing unprecedented changes and challenges. This paper will discuss the innovative practice of intelligent recommendation and customized itinerary planning of tour guides in tourist attractions, and analyze their role and potential in improving the tourism experience and promoting the digital transformation of the tourism industry. By combining artificial intelligence, big data analysis and virtual tour guide technology, we propose an innovative digital person system for tour guides, which can provide tourists with intelligent scenic spot recommendation and personalized itinerary planning services. This paper will also elaborate on the objectives, plans, features and innovations of the project, and discuss the challenges and prospects in the project implementation process. Through the implementation of the project, we expect to bring a new tour experience to the tourism industry, improve tourist satisfaction, and promote the sustainable development of the tourism industry.

Key words: tourist attractions; tour guide, digital person; intelligent recommendation; customized itinerary planning; digital transformation

1. Foreword

With the rapid development of tourism and the diversification of tourists demand, the traditional tour guide service has been difficult to meet the personalized needs of tourists (Gao Yunfei 2024). Traditional fixed itinerary arrangements often fail to fully meet the interests and time limits of tourists, while the digital guide

intelligent recommendation and customized itinerary planning project aims to provide tourists with more intelligent and personalized tour services through the application of advanced artificial intelligence and big data technology. This paper will deeply explore the innovative practice and application prospects of the project, and provide new ideas and methods for the digital transformation of the tourism industry.

2. Overview of the digital person system of tourist attractions

The guide digital person system is an innovative guide method based on artificial intelligence and big data technology (Yuan Shenghua, Zhang Teng, Niu Jianwei.2020). The system collects and analyzes the relevant data of tourist attractions, including scenic spot information, tourist preferences, historical visit records, etc., and uses the intelligent recommendation algorithm to provide personalized scenic spot recommendation and itinerary planning for tourists. At the same time, combined with the virtual tour technology, tourists can experience the beautiful scenery of the scenic spot in advance through the digital guide system, understand the history and culture of the scenic spot, and enhance the interactivity and interest of the visit.

We conducted in-depth research on the digital development status of the domestic and foreign tourism industry. Zhang Jucheng, Li Yiming, Cheng Ruxia (2020) discussed the paper,(Zhang Jucheng, Li Yiming, Cheng Ruxia.2020). Finally, the theoretical structure of the research is reviewed, and proposed(Zhang Jucheng, Li Yiming, Cheng Ruxia. 2020). On April 18,2023, Beijing second foreign languages institute of tourism science professor li published in the People's Daily "digital" upgrade "scenic area tour experience (focusing on culture) digital" introduces the concept and characteristics of digital scenic area, and some domestic and foreign digital scenic spot practice cases, such as digital dunhuang, the imperial palace, wutai mountain, etc., analyzes the digital scenic spot for scenic resources protection, cultural display, the role and significance, and digital scenic area construction challenges and opportunities. On April 11,2022, published in the People's Daily article for "foreign digital tourism to speed up the development of" reported some foreign digital tourism projects, such as Egypt "experience at home in Egypt" series of fine cultural projects, the Louvre virtual visit, London natural history museum online exhibition, illustrates the digital tourism during the epidemic prevention and control provides a new way of cultural consumption and spiritual enjoyment. The article "Research and development status of smart tourism at home and abroad" summarizes the definition and characteristics of smart tourism, compares the different understandings and concerns of smart tourism at home and abroad, analyzes the development status and existing problems of smart tourism, and puts forward the development trend and suggestions of smart tourism. To understand the application and prospect of tour guide digital person and intelligent itinerary planning at home and abroad. We will fully learn from and combine the latest research results and innovative practices at home and abroad to make our projects competitive in the domestic and foreign markets.

Based on the above knowledge, conditions, expertise, interests, the existing achievements, preparation and understanding of the research situation and development at home and abroad, we have the confidence and ability to successfully implement the scenic spot guide digital intelligent recommendation and customized itinerary planning project, and digital upgrade for tourism industry and make important contributions to improve the service level.

3. Intelligent recommendation and customized itinerary planning implementation

The key to realize intelligent recommendation and customized itinerary planning lies in the application of advanced artificial intelligence and big data analysis technology (Zhang Li.2020). First, through the data mining and analysis of tourist preferences and behavior patterns, we can extract the points of interest and needs of tourists. Then, the intelligent recommendation algorithm is used to combine the preferences and time limits of tourists to generate personalized scenic spot recommendation and itinerary planning scheme for tourists. In addition, the tour guide digital person system also supports real-time interaction and voice tour function, visitors can ask questions, seek answers, and get instant tour service. As shown in **Figure 1**.

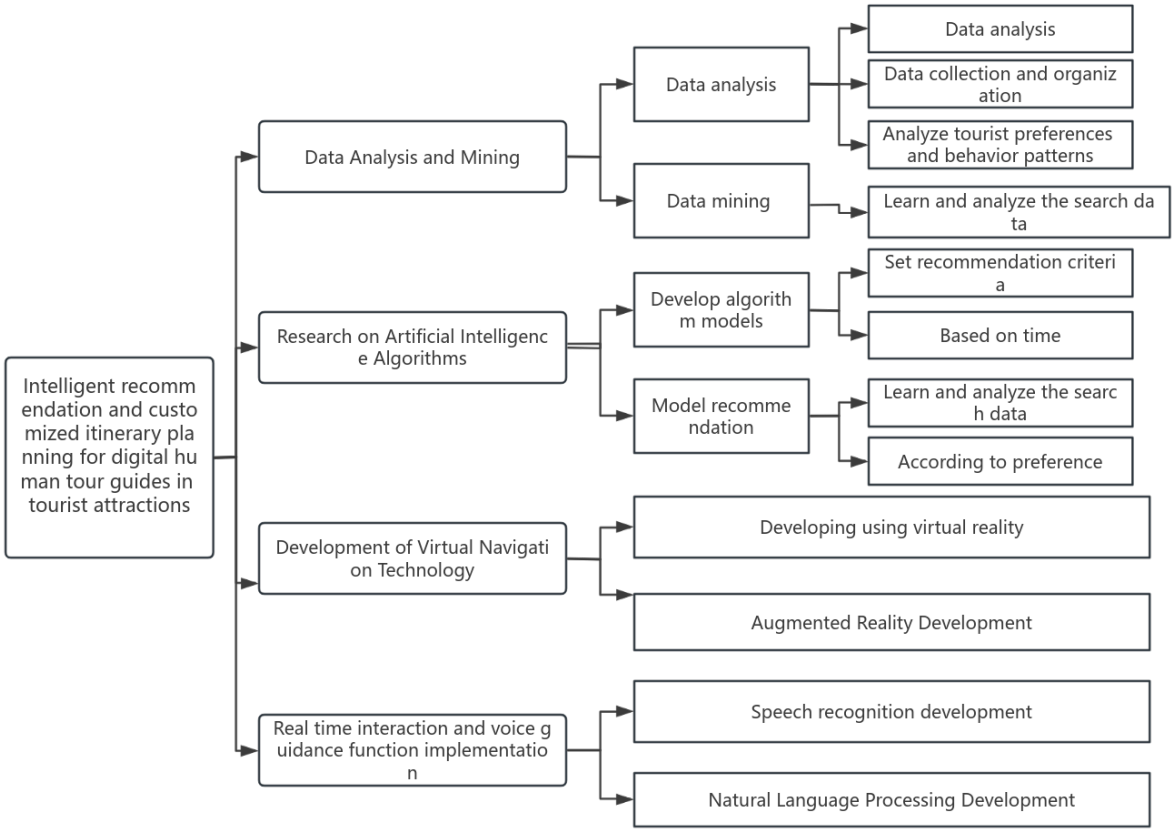

Figure 1 Intelligent recommendation and customized itinerary planning of tour guides in tourist attractions

3.1 Data analysis and mining

Data analysis and mining refers to the processing, analysis and mining of the collected data through statistics, machine learning and other technical means, so as to reveal the internal laws and associations in the data, and to provide a scientific basis for the decision-making of enterprises or researchers. Its goals include discovering hidden patterns in the data, predicting future trends, optimizing business processes, and improving decision-making efficiency.

By collecting, sorting out and analyzing the relevant data of tourist attractions, tourists' preferences and behavior patterns are extracted to provide a basis for recommendation and itinerary planning. Data analysis and mining is a complex process involving multiple steps and techniques that aims to extract useful information, insights, and patterns(Cui Liping, Cui Bing.2003)from large amounts of raw data. The following is a detailed introduction of data analysis and mining. First, data collection. According to the analysis objectives, relevant data is collected from various sources, including databases, log files, questionnaires, etc. The second is data cleaning, pre-processing of the collected data, including the removal of duplicates, processing of missing values, transformation of data types, etc., to ensure the quality and accuracy of the data. The third is data exploration, through visualization tools or statistical methods, the preliminary exploration and analysis of the data, to understand the distribution, correlation and other characteristics of the data. The fourth is data modeling. According to the analysis requirements, select the appropriate data mining algorithms and models, such as classification, clustering, association rules mining and other (Chen Yunchuan, Song Hao, Zhao Ye, et al.2020). Fifth, model training and evaluation. The training data set is used to train the model, and the model is evaluated and optimized through the test data set to ensure the accuracy and reliability of the model (Chang Jing, Liu Xiaoming, Li Mengrui. 2020). Sixth, the interpretation and application of the results, explain and analyze the excavated results, extract valuable information and insights, and apply them to the actual business scenarios, such as formulating marketing strategies, optimizing product design, etc.

3.2 Artificial intelligence algorithm research and development

Machine learning, deep learning and other technologies are applied to design intelligent scenic spot recommendation and itinerary planning algorithms, and generate personalized recommendation and planning schemes according to tourists' preferences and time constraints. In the tourism industry, the development of AI algorithms plays a crucial role, especially in the recommendation of smart attractions and itinerary planning. With advanced technologies such as machine learning and deep learning, we are able to design more intelligent and personalized algorithms to provide more accurate and intimate services for visitors.

First of all, in terms of smart scenic spot recommendation, the algorithm comprehensively considers multiple factors, including tourists' preferences, historical tour records, features of scenic spots, and real-time weather, traffic and other information. Through in-depth analysis and mining of these data, the algorithm can identify the potential interests and needs of tourists, and accordingly recommend the scenic spots that most match their tastes. At the same time, the algorithm will also dynamically adjust according to the real-time situation of the scenic spots, such as the flow of people, evaluation, etc., to ensure that the recommended scenic spots not only meet the expectations of tourists, but also have practical feasibility. Second, algorithms also play an important role in itinerary planning. Based on information such as time constraints, budget constraints and tour preferences, the algorithm can automatically generate personalized itinerary plans. These plans not only include the selection of scenic spots and the order of sightseeing, but also take into account various factors such as transportation mode, catering and accommodation. By optimizing the algorithm, we can ensure that the generated itinerary can meet the needs of tourists and reduce unnecessary time and cost consumption as much as possible. In addition, in order to continuously improve the performance and accuracy of the algorithm, we also need to do a lot of data collection, pre-processing and model training work. This includes collecting tourist data from various sources, information about scenic spots, real-time weather and traffic data, cleaning data, integrating and marking the data for the model(Fan Haibing, Hu Xixing, Liu Mingyi, et al.2020), and improving the prediction accuracy and generalization ability of the algorithm by constantly adjusting and optimizing the parameters and structure of the model.

To sum up, the application of AI algorithms in the tourism industry has broad prospects and great potential. Through continuous research and development and optimization of algorithms, we can provide more intelligent and personalized services for tourists, and promote the sustainable development and innovation of the tourism industry.

3.3 Development of virtual tour technology

The development of virtual tour technology is a major innovation in the tourism industry in recent years. It uses advanced virtual reality (VR) and augmented reality (AR) technology to bring an unprecedented immersive tour experience to tourists. The emergence of this technology not only enhances the visual presentation effect of the scenic spot, but also greatly improves the interaction and sense of participation between tourists and the scenic spot. First, let's talk about the application of virtual reality (VR) in the virtual tour. VR technology creates a three-dimensional virtual environment, so that tourists can feel the style and features of the scenic spot. Tourists only need to wear VR equipment, and they can be placed in a world completely built by digital technology, as if they have really entered the scenic spot. In this virtual world, tourists can freely explore every corner of the scenic spot, observe every detail, and feel every scenery. This immersive experience makes tourists seem to travel through time and space, and have a deeper emotional connection with the scenic spot. In addition to VR technology, augmented reality (AR) also plays an important role in the virtual tour. AR technology can stack the virtual information into the real world, so that tourists can receive the virtual information related to the scenic spots while enjoying the real scenery. For example, when visiting historic sites, AR technology can show the historical background, architectural style and other information, helping visitors to have a deeper understanding of the cultural connotation of scenic spots. The integration of this technology with the real world brings visitors a richer guided tour experience. The development of virtual tour technology

also involves a lot of data analysis and processing technology. To create realistic virtual environments, developers need to collect a lot of data about the scenic spot, including terrain, buildings, vegetation and other information. The data needs to be carefully processed and integrated to create a real, tangible virtual world. At the same time, in order to improve the guide experience, developers also need to conduct in-depth analysis of tourists' behaviors and interests, so as to provide them with more personalized and accurate guide services. The development and application of virtual tour technology not only improves the tour experience of tourists, but also brings more business opportunities to the tourism industry. Through the virtual tour, the scenic spot can attract more tourists to visit and increase the ticket revenue. At the same time, the scenic spot can also use the virtual tour technology to carry out online marketing activities to expand the brand influence. In addition, the virtual tour technology can also provide more abundant value-added services for the scenic spots, such as virtual shopping, virtual tour guides, etc., to create more revenue sources for the scenic spots.

In short, the development of virtual tour technology is an important innovation in the tourism industry. It utilizes both virtual reality and augmented reality technology It provides an immersive tour experience for tourists and enhances the visual presentation and interactivity of the scenic area. With the continuous progress of technology and the continuous expansion of application scenarios, it is believed that the virtual guide technology will bring more surprises and possibilities to the tourism industry in the future.

3.4 Real-time interaction and voice navigation functions are realized

Using speech recognition, natural language processing and other technologies, the real-time interaction between the tour guide and tourists and voice navigation function, to provide real-time solutions and tour services. The realization of real-time interaction and voice navigation function mainly relies on a series of advanced technical means such as speech recognition and natural language processing.

First, the real-time interaction function is realized. The core of the real-time interaction function is to enable the tour guide and the digital people to accurately understand the voice input of tourists, and make timely and appropriate responses. The realization of this function mainly relies on the speech recognition technology, through the high-precision speech recognition algorithm, the speech of tourists into text information. This process requires the algorithm to accurately identify various accents, speed and background noise to ensure the accurate transmission of information; natural language processing technology on the basis of speech recognition. This includes lexical analysis, syntactic analysis, semantic understanding, in order to extract key information and intentions from tourists input; dialogue management, according to the tourists' intention and context information, the guide needs to choose the appropriate response strategy and content. This may require the help of some preset rules or models, as well as knowledge and experience learned from large amounts of data.

The second is the voice guide function, the voice guide function is more attention to providing tourists with accurate and vivid scenic spot introduction and tour services. The realization of this function also depends on the above speech recognition and natural language processing technology, but it also needs to be optimized in combination with some specific application scenarios and requirements, such as scenic spot information database. In order to provide accurate guide service, it is necessary to establish a database containing detailed information of scenic spots. This includes the historical background, cultural connotation, architectural style and other aspects of the attractions, as well as related pictures, videos and other multimedia materials; such as personalized recommendation, according to the interests and preferences of tourists, as well as the current location and time information, the digital guide can provide personalized attractions recommendations and tour routes. This helps to improve tourist satisfaction and experience effect (Li Ruyou, Shi Zhangyu.2022); such as multilingual support, to meet the needs of tourists of different nationalities and regions, the voice guide function requires multilingual support. This can be achieved by training multilingual versions of speech recognition and natural language processing models.

In practical applications, tourists can obtain the tour service through voice interaction with the guide digital person. For example, visitors can ask for

information about a scenic spot or ask a guide digital person to lead themselves to an area. The guide will provide corresponding voice response and tour content according to the request of tourists and the current scene.

4. Analysis of characteristics and innovation points

The features and innovations of the intelligent recommendation and customized itinerary planning project are mainly reflected in the following aspects: first, intelligent recommendation and planning, through the application of artificial intelligence and big data technology, realize personalized scenic attraction recommendation and itinerary planning; second, the application of virtual tour technology, provide tourists with immersive virtual tour experience(Zhang Ji, Yang Wenxin, Liang Xiaohui, Wang Xia, Wu Huiting, Jiang Lei, Yang Xiaoyu.); third, real-time interaction and voice navigation function, provide convenient and personalized tour service (Wei Shanguan. 20121); fourth, promote the digital transformation and service upgrading of the tourism industry, and improve the quality and efficiency of tourism service.

5. Project implementation and challenges

During the implementation of the project, we will face some challenges, such as the complexity of data collection and processing, the optimization and accuracy improvement of intelligent algorithms, the implementation of virtual tour technology and the improvement of user experience. To overcome these challenges, we will strengthen teamwork and actively seek technical support and cooperation opportunities, while focusing on the feedback and improvement of user experience, and constantly improve and optimize the system functions and performance.

6. Conclusion and Outlook

The intelligent recommendation and customized itinerary planning project provides new ideas and methods for the digital transformation of the tourism industry. Through intelligent recommendation and planning, the application of virtual tour technology, and the provision of real-time interaction and voice navigation function, the project is expected to bring more personalized and convenient guide experience to tourists, and improve tourism satisfaction and the competitiveness of the industry. However, there are still some challenges and problems in the project implementation process, which require continuous technology development and marketing. In the future, we will continue to pay attention to the development trend of the tourism industry and the changes of the needs of tourists, constantly improve and optimize the digital person system of tour guides, and promote the digital transformation and sustainable development of the tourism industry.

Through the discussion and analysis of this paper, we believe that the intelligent recommendation and customized itinerary planning project of tour guides in tourist attractions will bring great innovation potential and commercial value to the tourism industry, provide tourists with more intelligent and personalized tour services, and promote the digital transformation and upgrading of the tourism industry.

Reference

[1] Gao Yunfei. Design and implementation of the self-service tour system based on Android [D]. South-Central China University for Nationalities [2024-06-19]. DOI:10.7666/d.D01198446.

[2] Yuan Shenghua, Zhang Teng, Niu Jianwei. Application of digital twinning technology in the field of aerospace manufacturing [J]. Strength and Environment, 2020,47(3):8.DOI:10.19447/j.cnki.11-1773/v. 2020.03. 009.

[3] Zhang Jucheng, Li Yiming, Cheng Ruxia. Review of smart tourism research at home and abroad [J]. Tourism Guide, 2020,4(5):18.DOI:10.12054/lydk.bisu.157.

[4] Zhang Jucheng, Li Yiming, Cheng Ruxia. Review of smart tourism research at home and abroad [J]. Tourism Guide, 2020,4(5):18.DOI:10.12054/lydk.bisu.157.

[5] Zhang Li. Experience the in-depth development of cultural tourism in Huizhou ancient villages under the economic and industrial environment [J]. Huizhou Social Science, 2020 (1): 7.

[6] Cui Liping, Cui Bing. Research on telecommunication data mining based on rough set data analysis method [J]. Shanxi Communication Technology, 2003,24 (4): 6.

[7] Chen Yunchuan, Song Hao, Zhao Ye, et al. Data

mining and application of campus one-card based on logistic regression algorithm [J]. Journal of Kunming Metallurgical College, 2020 (003): 036.

[8] Chang Jing, Liu Xiaoming, Li Mengrui. Ship Navigation Safety Assessment model based on SVR [J]. Journal of Shanghai Maritime University, 2020,41(2):6.DOI:10.13340/j.jsmu. 2020. 02.005.

[9] Fan Haibing, Hu Xixing, Liu Mingyi, et al. Application of deep learning in corrosion detection of electric power equipment [J]. Guangdong Electric Power, 2020,33(9):12.DOI:10.3969/j.issn.1007-290X. 2020.009. 020.

[10] Li Ruyou, Shi Zhangyu. The influence mechanism of tourist value co-creation behavior on tourism satisfaction —— a regulated mediation model [J]. Resources and Environment in arid Zone, 2022,36 (8): 8.

[11] Zhang Ji, Yang Wenxin, Liang Xiaohui, Wang Xia, Wu Huiting, Jiang Lei, Yang Xiaoyu. Application exploration of 5G Smart Cultural Tourism in Kuanzhai Alley Scenic Spot [J]. Communication and Information Technology, 2020 (5): 5.

[12] Wei Shanguan. Development status and prospect of smart subway in China [J]. Student Computers, 2021 (5): 0483-0483.