

Research on intelligent recommendation strategy of activity types based on visitor insights--take Zhujiajiao ancient town as an example

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Abstract: As an effective path for the integration of culture and tourism, digital cultural tourism is an exploratory thinking to promote the transformation of local tourism. With the continuous deepening of digital applications such as AI and AR, many excellent intelligent navigation solutions have been applied to the tourism field, and the analysis of data related to tourism preference insights has also made great progress^[1]. But research into smart recommendation schemes for activity types still faces a range of problems. Based on the insight of tourist behavior preferences in Zhujiajiao and the surrounding cultural tourism towns, this study explores the possibility of AI technology interactive scenes from the perspective of emotions and social situations for the tour of activity types, so as to realize more convenient and accurate intelligent recommendation of human-computer interaction and promote the overall digital and intelligent transformation of scenic spots.

Keywords: Digital Cultural Tourism; Intelligent recommendation; Visitor insights; The activity type

1. Introduction

Intelligent tour guide for specific scenes is more commonly used in tour scenes, and the technology is more mature. With the digital development of intelligent tour guide, with the support of cloud computing, big data, indoor positioning and navigation, virtual reality, augmented reality and other technologies, the tour service reflects the characteristics of all-round and intelligent^[2].

This research attempts to integrate cultural factors into the interesting construction process through AR and AI interactive technology. Before tourists start to play, a virtual situation is created to provide tourists with AR tours and characteristic route planning, and to improve the service level of tour guides. To meet the needs of tourists and the real-time communication of scenic spots, so that tourists can fully experience the influence of scenic spots^[3].

2. New opportunities for the development of intelligent navigation platforms in the digital economy

Under the guidance of the digital economy development strategy, through the blessing of artificial intelligence and cloud computing algorithms and computing power, the interaction mechanism between the real scene world and the virtual digital world has become more and more close. In the scene of the cultural tourism town, digital technology has also continuously promoted the formation of many intelligent tour platforms. New forms such as online "cloud tourism" and virtual smart tours are bringing tourists a new travel experience through the combination of real and virtual.

Compared with foreign countries, domestic smart and intelligent tours started late, but developed rapidly. With the advancement of smart cultural tourism, more and more scenic spots have accelerated the pace of intelligence. At present, many digital scenic spots can integrate the technology of mobile terminal, two-dimensional code, scenic spot information database collection and positioning technology, and provide visitors with more content guide through audio and video, AR, VR, 3D and other forms. browsing experience. Alipay, Baidu, WeChat and other social platforms have also launched many augmented reality interactive projects for scenic tour guide services^[4]. In the future, the application and development of intelligent tour guide in the guide service of cultural tourism towns will be more extensive by means of online communication and integration of offline services.

Table 1: Digital and intelligent guide projects at home and abroad

No.	Project Name	Main Functions
1	Hadrian's Wall	An application called "Explore Hadrian's Wall", which uses technologies such as virtual reality (VR) to reproduce the original appearance of the Great Wall and achieve a comparison between ancient and modern.
2	Archaeological Museum of Naples	A game based on the story of a son's archaeological journey in pursuit of his deceased father, realizing the function of learning cultural relics and archaeological knowledge in use.
3	Singapore Asian Heritage Museum	With the help of (AR), 3D, and positioning technology, an interactive game was designed for the special exhibition "Terracotta Warriors and Qin Culture".
4	National Museum of China	500 cultural relics were displayed online.
5	Guangdong Provincial Museum	Created a "Snow Treasures" app based on Xinjiang cultural relics
6	Palace Museum	Small programs such as "Daily Palace Museum" and "Forbidden City Ceramics Museum" have been developed to present the cultural treasures of the Palace Museum themed.

Source: The author organizes according to the development status of museums in various places

3. Related concepts and research overview

3.1 Types of activities and classifications

Tourist activity is a special activity in consumption activity. According to the "National Tourism and Related Industry Classification (2018).", it points out that tourism covers a variety of activities such as catering and accommodation, consumption and shopping, sightseeing and entertainment. Combined with the existing classification research results of the standard and based on the development status of cultural tourism towns, the types of tourism activities can be subdivided into tourist attractions, hotel accommodation, leisure and catering, leisure and entertainment and leisure shopping due to the different types of business carriers. 5 types of business types with different service characteristics such as classes^[5].

The choice of tourist activity types is similar to the shopping behavior of consumers. One is pragmatic activity based on pragmatism for the purpose of obtaining products and services, and the other is based on hedonism in order to obtain satisfaction, excitement, escape, etc. Hedonic activity behaviors that experience related sensations.

3.2 Smart tour and its classification

Table 2: Different types of tour products

No.	Type	Functions
1	Comprehensive	Ctrip, Fliggy, Tuniu, etc. with e-commerce genes can provide services such as travel ticket booking, hotel selection, ticket booking, and travel strategy sharing.
2	Social	Mafengwo Tourism mainly builds a tourism interactive community by sharing local scenery, local culture, tourism experience and travel itinerary, and provides suggestions for other tourists to travel.
3	Instrumental	eLong Travel, focusing on travel services, gathers various hotel and flight updates to provide reference for tourists' travel plans.
4	Specific	Disney, serving a specific scenic spot, is more accurate and professional, and integrates the smart travel app through the panoramic area to create a visual and digital travel experience that connects online and offline in real time.

Source: The author arranges according to the purpose of the intelligent navigation platform of the scenic spot

The intelligent tour guide of the cultural tourism town is mainly to enhance the tourist experience. In the past, the most common forms of tour guide were as follows: first, the scenic spot guide display card;

second, the guide manual guide; third, the scenic spot provides tourists Rent related tour equipment. However, the actual tour is relatively limited, and it is impossible to adapt to changes in a complex environment. At present, many tourism product suppliers have developed apps and official accounts, and with the help of the "smart tour guide platform", they provide tourists with services such as ticketing channels, scenic spot details, hotel accommodation, transportation, etc, and optimize tourists' travel routes in a timely manner to improve services efficiency.

According to the types of products and user groups, smart tours can be divided into the categories in Table 2.

At present, the technologies applied in the integrated development of digital culture and tourism are mainly based on 5G integrated applications, through artificial intelligence (AI) technology and augmented reality (Augmented Reality, AR) technology to create virtual reality to optimize the tourist experience, and to break through information barriers, With the help of 3D modeling, intelligent interaction, intelligent sensing and other methods, it promotes the integration of virtual world and real scenic spot tours, and creates a new tour guide service. With the blessing of new technologies, the audience's experience of visiting has been enriched many times, and the visualization of online pictures and videos has greatly improved the interesting readability of the exhibition information^[6].

3.3 Tourist insights in emotional and social contexts

In Fredrickson's (2005) research, positive emotions can help tourists to obtain psychological satisfaction, interpersonal resources, etc., help tourists to adapt to the environment and develop themselves, to achieve autonomous needs and relationship needs. Isen (2002) found that tourists under positive emotions showed higher problem-solving ability and could achieve more competency needs. This study divides tourists' emotions into positive and negative emotions. Under the influence of positive emotions, tourists will more easily enhance their sense of self-worth through pleasure, participate in on-site activities to show their abilities, and are more willing to communicate and interact with people in the surrounding environment. Relationship needs and autonomy needs.

Gao Xue (2019) pointed out that the environment in which tourists live is very different from the shopping environment in their daily residence. This situational difference will have an impact on tourists' psychology. The social situation is to give priority to the sociality of the travelers during the travel process, and whether there are companions. Among them, companions refer to those who have an influence on tourists in the tourism situation, such as companions and family members. Ryan and Deci (2000) in the self-determination theory (The self-determination theory) proposed that basic psychological needs include three concepts: autonomy needs, competency needs and relationship needs. In the tourism scene, according to the different travel companion status of tourists, the social situation is divided into travel alone and travel together. In life, tourists who travel together have a stronger degree of realization of relationship needs and prefer to share travel experiences. Tourists who travel alone, lack the activities to connect with other social people, and are more likely to realize their autonomous needs^[7].

4. Development status of activity types in Zhujiajiao Ancient Town

Zhujiajiao Ancient Town has a long history with a history of more than 1,700 years. It is located on the shore of Dianshan Lake, with beautiful scenery and a variety of people. The total area is 3.08 square kilometers, and the core area is 0.68 square kilometers. The ancient town has a profound cultural heritage and a superior cultural and tourism resource base. As the first choice for Shanghai citizens, including tourists from surrounding provinces and cities, the development of Zhujiajiao Ancient Town is not only radiated by Shanghai, but also reacted to the entire Yangtze River Delta, forming a relationship of mutual influence and mutual promotion.

Combined with public comments and play guides, this study conducted on-site investigations and on-site interviews on the current situation of tourists visiting Zhujiajiao Scenic Area with different types of activities and the status of intelligent recommendation on the platform.

There are many shops in Zhujiajiao Ancient Town. Through field visits, this article has made a simple one-dimensional division of the types of activities in the ancient town, and divided them into six different types. Leisure and entertainment activities include Smart Moment Comprehensive Entertainment Experience World, Shuiyuetang, Zhujiajiao Kezhi Garden, Zhujiajiao City God Temple, and Daqing Post Office, and parent-child activities include Watercolor Art Museum, Kaikai Fish Therapy, and shopping. Such activities include Zhushi Daji and Yule Jewelry, and activities belonging to life services include

Jingting B&B and Zhujiajiao Art Silhouette Studio.

Table 3: Zhujiajiao Ancient Town Activity Type and Popularity Ranking

No.	1	2	3	4	5	6
All Categories	Food	Leisure and entertainment	Attractions	parent-child	Shopping	Domestic services
1st by popularity	Wangjiang Building	Smart Moment Comprehensive Entertainment Experience World	Zhujiajiao Class Planting Garden	Watercolor Art Gallery	Zhushi Daji	Jingting Homestay
2nd	Ginkgo tree grandma rice dumpling	Shuiyuetang	Zhujiajiao City God Temple	Kai Kai Fish Spa	Yule Jewelry	Zhujiajiao Art Silhouette Studio
3rd	Fishing Water House Firewood Vegetable Rice	Chen Xidan Watercolor Studio	Daqing Post Office	Ledao Xintian Parent-Child Camp	Juli Yaji	fitness studio
4th	Dongtian Restaurant	Tashi Dawa Tibetan Culture Experience Center	Quanhua Watercolor Art Museum	Yacht Club	sicilian town	drift kart
5th	Qing Dynasty Shuzhaijiaoli Compound	Shanghai Handicraft Zhujiajiao Exhibition Hall	Folk Culture Exhibition Hall	Four Seasons Pagoda	Dongduwa City	Hanfu and Cheongsam Cultural and Creative Workshop



Figure 1: Public comment food recommendation Figure 2: Dianping Shopping Recommendations

Through on-the-spot investigation on the daily flow of people of different types of activities, it is found that the attraction ability of different types of activities is quite different.

At present, the recommended platform for activity types in Zhujiajiao Ancient Town is its WeChat public account "Zhujiajiao Tourism". Although there have been relatively significant results in the reservation mechanism, and tourists have recommended tour routes, but in terms of functional applications, there is still alienation between tourists and scenic spots, and it is still impossible to completely realize different types of activities for tourists based on their emotions and social situations. accurate recommendation service.

Table 4: The flow of people in Zhujiajiao Ancient Town in low and peak seasons for different types of activities

Type of research	Research location	Off-season daily traffic	Peak season daily traffic	Average daily traffic
Food	Ginkgo Granny Rice Dumpling	350	1000	675
Leisure and entertainment	Smart Moment Comprehensive Entertainment Experience World	28	148	88
Attractions	Class Planting Garden	1500	3000	2250
parent-child	Watercolor Art Gallery	200	430	315
Shopping	Zhushi Daji	290	780	535
Domestic services	Jingting Homestay	20	60	40

5. Recommended strategies for activity types in Zhujiajiao Ancient Town

5.1 "Cultural Tourism + Technology" AR navigation guide

The tourism resources of Zhujiajiao Ancient Town are relatively well preserved. The largest Jiangnan Garden Class Planting Garden in the town and scenic spots such as Yuanjin Temple, Fangsheng Bridge, and North Street with small overall architectural structure can be enhanced by mini-programs to enhance the images of real-life scenes such as characteristic buildings and cultural relics to form the basis of the guide platform. Images, by combining map guides with real-time street views with AR technology, through images such as arrow pointers, and text information superimposed on the scene, help users reach their destinations more conveniently and accurately. At the same time, small stories from the Ming and Qing Dynasties are incorporated into the guided tour, such as Dong Qichang and many other famous poems and inscriptions to help tourists explore and learn in real time and understand the cultural history of Zhujiajiao Ancient Town. For the activities of the scenic spot, different versions of the online explanation will be recorded by a number of different commentators for the audience to choose, and the content is mainly pictures, videos and audio explanations. Through the three-dimensional dynamic visual map, tourists can learn online and directly choose to book the scenic spots in advance, or scan the QR codes specially made for different scenic spots in Zhujiajiao Ancient Town offline, so that the existing recommended visits can be optimized according to their own visiting time. The route greatly saves the waiting time for sightseeing^[8].

5.2 "Interaction + Game" AR interactive experience

Based on the tourism culture, Zhujiajiao has not only created cultural and creative products such as "Zhu City Daji" and Daqing Rice Wine, but also vigorously launched many cultural and creative brands, including the series of cultural and creative products of Daqing Post Office and Han Dalong Sauce Garden. Sauce Garden's "pickled vegetable series" products have also won the gold medal at the Panama Expo, and specially reserved the "pickled vegetable making" technical experience, the most complete Tongtian in Shanghai, and the production of the non-legacy paste formula of the Chinese medicine number. Based on positive emotions, it can promote tourists' consumption insights for hedonic activities to have higher psychological satisfaction needs, develop various types of AR games, integrate entertainment elements into the physical environment of tourist attractions, and enhance the relationship between tourists and attractions and cultural relics. Interaction, enhance their travel experience and immersion, and promote sharing between users. For example, small games such as how to make pickles can be developed on the platform to enhance the fun of platform interaction and attract tourists to interact on the spot.

5.3 "History + Immersion" AI digital intelligence space

In the 1940s' "Jiaoli Time-honored Brand Revival" plan, a number of famous time-honored brands emerged in Zhujiajiao, including Tongde Oil Factory, Renhetang Guo Pharmacy, Hengtaixiang Rice Shop,

Wenqinzhai Painting Shop, De Shengcaiguan, Senlian Pawnshop, Tongyuan Zaofang and other famous time-honored brands. In the exhibition hall of the scenic spot, an immersive smart screen is set up at the entrance of the scenic spot, with built-in AI recognition and interaction, and an event scene with the theme of "the old brand of the 1940s" street shop is developed to show the profound cultural heritage of Zhujiajiao in a 360-degree view for users Enhance the interactive experience.

5.4 "Situation + Activity" AI personalized recommendation

Zhujiajiao's hedonic activities are mainly reflected in many interesting local theatrical performances, such as the water music hall with musical characteristics created by Tan Dun, the national intangible cultural heritage project Tian Ge musical "Jiao Li Ren Jia", and wonderful cultural and artistic performances. Performances, such as Tang Xianzu's Kunqu Opera "Peony Pavilion" and the martial arts drama "Family on the Water", etc. The practical activities in Zhujiajiao are mainly local food and catering activities. The more famous ones are trotters with oil, pickles, zongzi, zharou, rock candied gourd, braised zharou, grandmother zongzi, oil dunzi, glutinous sugar lotus root, braised snails, pickles, lotus seeds, water chestnut, etc., all of which can be recommended on demand. Based on tourist insights, the interactive experience of cultural tourism is customized around the individual needs of tourists. Through AI facial expression interaction, gesture recognition, body recognition and other interactive methods, it can intelligently recommend and customize tour routes for users.

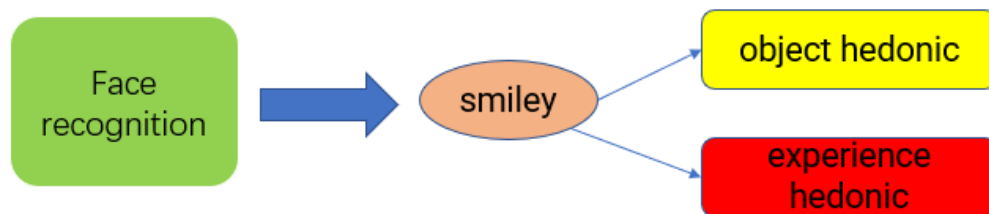


Figure 3: Recommended logic diagram

Among them, the AI's personalized plan is based on a certain system architecture, and can recommend intelligent travel plans to tourists through "guess what you like" and "recommended travel routes in Zhujiajiao Ancient Town". The intelligent recommendation scheme based on the "I want to customize" module first needs to define the characteristic information of tourists. The system selects the specific state of tourists when they arrive at the scenic spot, and collects the characteristic information of tourists, mainly the travel mode, geographical composition, and travel time of tourists. Length, emotional state and social situation state during travel, establish a large database.

Through the relevant research on tourist insights, it is first determined that it is necessary to carry out intelligent identification and accurate recommendation based on the emotional state of tourists. Referring to the conclusion of the study, tourists with positive emotions prefer physical hedonic and experiential hedonic activities, and rational mode plays a moderating role. Based on the emotional perspective, this study plans and explores the following optimal recommendation strategies.

Before playing, visitors will click on the applet to log in and enter the interface. With the help of AI technology, there will be emotional function options and face recognition scanning entrances. Visitors can choose their own emotional state at that time, or they can use the scanning path to scan tourists. Recognition of facial expressions to judge the emotional state of tourists. If the background receives instructions related to positive emotions, or recognizes facial expressions related to positive emotions, such as smiling faces, the platform will make intelligent recommendations according to the instructions.

Through relevant investigation and research, we found that positive emotions will make tourists more likely to choose physical hedonic activities and experience hedonic activities. Then our intelligent recommendation will combine the actual seasonal activities of the scenic spot, and automatically recommend more physical hedonic activities to tourists with positive emotions, such as the hot-selling items of the season in Zhushi Daji in the scenic spot. Experience-related business activities will also be recommended, such as Tang Xianzu's Kunqu Opera performance and Tan Dun's Moon water Auditorium. It will also recommend group-oriented directional activities according to their specific needs to meet more tourist preferences.

6. Conclusion

In recent years, the iterative upgrade of digital technology has promoted the continuous development of smart tourism. With the support of technologies such as "cloud" tourism and VR virtual tourism, the digital development of destinations has gradually become the mainstream. The embedded technology of the Internet of Things integrates the protection and inheritance of history and culture, allowing the scene to be reproduced and forming more interesting new paths for the digital transformation of cultural tourism towns.

In the future, in the process of recommending tourist activity types, more reference can be made to the emotions and social situations of tourists, and more interesting hedonic activities can be recommended, which may attract more attention and increase the tourist flow of scenic spots. Especially for some middle-aged and elderly tourists, in the future, at the entrance of the scenic spot, you can also try to set up a guide robot for interactive communication to carry out accurate intelligent recommendation based on the perspective of emotions and social situations, enrich the tourist guide experience, improve Scenic service level.

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