A Study on Intelligent Tourism App Based on Artificial Intelligence

Jia Xue*
Chengdu Polytechnic, Chengdu 610041, Sichuan, China
*Corresponding author e-mail: xuejia@cdp.edu.cn

Abstract. With the rapid development of science and technology and the rapid development of network applications, the Internet era has been promoted, and the popularity of smart phones has made great changes in people's way of life. More and more rely on mobile phone applications to deal with the scale of life. At the same time, with the improvement of material living standard, people pay more attention to the pursuit of spiritual life, travel will become the perfect choice to relax body and mind, and smart phone tourism application (tourism app) is the basic way to realize intelligent tourism. The National Tourism Administration of the people's Republic of China issued a holiday tourism information circular saying that during the 2012 Mid-Autumn Festival National Day Golden week, 119 scenic spots in the country received 34.2456 million tourists, an increase of 40.7 percent over the same period last year, and the number of tourism complaints increased significantly. Tourist satisfaction is not optimistic. Intelligent tourism is the inevitable trend of the development of tourism in the world, and strategic demand for the transformation and upgrading of tourism in China.

Keywords: Artificial Intelligence, Intelligent Tourism, Competitiveness, Transformation and Upgrading

1. Introduction
In recent years, tourism presents a trend of individuation and mobility. Free travel has become the mainstream of travel, and mobile phone tourism applications provide unprecedented convenience for free travel. People can easily plan travel routes through mobile phone applications. However, existing tourism applications in the market fail to provide a "full set" of tourism services. Even integrated tourism applications only stay at a certain point or points, such as Ctrip travel mobile phone applications, focusing on ticketing, accommodation 12306 official version, smart train tickets, flight butler and flight standards, etc. Lack of systematic and comprehensive tourism services have some limitations.

Based on artificial intelligence technology in intelligent tourism app has attracted the interest of many experts and has been studied by many teams. For example, some teams found that with the continuous updating of mobile phone functions, more and more roles in people's lives, so that users in addition to the aesthetic requirements of the visual interface, began to pay attention to the user
experience, emphasizing the friendship of the human-computer interface. At present, the domestic interface design research starts late, the theory research to the user interface is relatively few, they looked up the data, found that since 2008, the number of papers, periodicals and so on about the user interface design began to increase, the related theory system has already sprouted initially [1]. They enter the keyword "travel" from the China Web site's query entry, "Interface Design", "Smart travel", "Mobile", Query shows, Before 2012, there was less literature on interface design for mobile tourism app applications, and web tourism app interface design research related to the literature is also less. Among them 2012 master thesis 1; Four master's papers in 2013, 3 periodicals; 4 master's thesis in 2014; Seven master's papers in 2015, 4 periodicals; 11 master's papers in 2016, 5 periodicals; Four master's papers in 2017, Nine journals. It's not hard to see, China's mobile tourism app application software interface design research is very lacking [2]. Some teams found that under the influence of the Internet wave, its service design thinking has begun to affect the actual operation of the industry, and there is a trend of gradual acceleration, the related research content gradually from service design theory, service design teaching and so on into the application and practice of service design. Shanghai ETU Design has also set up a service design project think tank composed of 9 graduate students, 3 service design mentors and 6 senior designers. The experience and practical results of service design projects have also been rapidly disseminated through international experience design conferences (IxDC) and user experience industry annual meetings (UXPA), creating a good environment for the development of service design in China [3]. Many scholars have found that in May and December 2012, the government set up pilot intelligent tourism cities in major tourism cities. After joining the wisdom tourism development plan in the 12th Five-Year Plan for tourism development, Shanghai, Nanjing, Shenzhen and other cities launched intelligent tourism development projects. In the Shanghai World Expo project, the latest "Smart City" network information technology has been adopted, covering information services, system management and intelligent security. Visitors can realize the function of electronic tour guide by notifying mobile intelligent equipment. Jiangxi Province through the establishment of Jiangxi Province Intelligent Tourism Information Network, through Taobao to achieve online sales of tourism products, the development of smart phone-based tourism information service software applications to promote the development of intelligent tourism in Jiangxi Province [4]. Other teams found that in our country, Professor Xie Yanjun's book "the basis of tourism" first mentioned the concept of tourism experience, he pointed out that tourism experience is a psychological and physiological sense of pleasure, emphasizing the interaction between tourists and the external environment and the change of the inner world [5]. Liang Yanming put forward four factors of tourism experience: tourists, experience activities, perceptual evaluation and scenic area environment. Comrade Zou elaborated the category, nature and construction elements of tourism experience. According to Longjiang, tourism research should pay attention to the experience elements of tourists, so as to construct the relevant discipline system [6]. Although their research results are very rich, there are still some shortcomings.

Intelligent tourism is the inevitable choice of tourism development in China, tourism is the core driving force to promote the development of intelligent tourism, through the intelligent tourism background of smart phone tourism application research, In order to provide theoretical reference and practical guidance for the healthy and orderly development of tourism, promote the transformation and upgrading of tourism in China.

2. Method

2.1. Similar User Clustering
Clustering of Similar Users: Calculating Similarity \( xi, xi \), between users according to user characteristic vector \( j \) is the coefficient between -1 and 1, Used to represent the similarity between two users, The larger the coefficient, The greater the similarity. As shown in formula (1), A formula for calculating Pearson correlations, The \( xi \) and \( yi \) here represent two A, columns The eigenvector, That is,
the age and gender of the user. According to xi, j size can filter out user clustering Uk similar to the user (k represents the size of the set) [7].

\[
\begin{align*}
  r &= \frac{\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2} \sqrt{\sum_{i=1}^{n} (y_i - \bar{y})^2}} \tag{1}
\end{align*}
\]

2.2. Stability Analysis
The Replication Dynamic Equation of Intelligent Tourism Service Process Evolution Game [8]:

\[
\begin{align*}
  F (y) &= \frac{dy}{dt} = y (1 - y) \left[ x (\alpha X - Y) + Y - C_d \right] \tag{2}
\end{align*}
\]

\[
\begin{align*}
  F (x) &= \frac{dx}{dt} = x (1 - x) \left[ y (\beta X - Z) + Z - C_u \right] \tag{3}
\end{align*}
\]

The Derivation of the Replication Dynamic Equation of Tourism Factor Providers [9]:

\[
\begin{align*}
  \frac{dx (x)}{dt} &= (1 - 2y) \left[ x (\alpha X - Y) + Y - C_o \right] \tag{4}
\end{align*}
\]

2.3. Partially Shared Classifiers
By using the shared classifier to add a linear function to the original feature vector, the classifier of source domain and target domain is designed. For source data points xs, the classifier can be expressed as [10]:

\[
\begin{align*}
  f (x^t) &= g (x^t) + \Delta s (x^t) = w^T \Omega c^t + u^T x^t \tag{5}
\end{align*}
\]

3. Experiment

3.1. Source of Experimental Data
Because the four existing smartphone operating systems have the highest market share and penetration, the scope of this study is defined as the operating system that publishes its official website platform "Android Market". The existing online smartphone applications are related to six elements of all smartphone applications.

3.2. Experimental Design
Firstly, using the literature research method, this paper expounds the basic concept, development course and advantages of the application program of smartphone tourism app; secondly, using the methods of statistical analysis and quality evaluation, the present situation of tourism app supply is interpreted from the aspects of quantity, type and quality performance; Finally, there are three main contradictions in the supply and demand of tourism app (the contradiction between tourism function and user demand, tourism marketing and potential users). The limitation of objective conditions and subjective factors and the strategic suggestion of balancing supply and demand are tourism intelligence, generalization, content refinement, function differentiation, experience perfection, operation simplification and channel diversification, team specialization.

4. Result

4.1. App Downloads
According to the selection conditions offered by the Android Market portal, Downloads are divided into three levels: "0-500,000", "500-200,000" and "2 million or more ", After statistics on existing tourism app indicators, The specific analysis results are shown in figure 1 below. As you can see from
the diagram, existing online travel app, more than 2 million download. Next, 50-2 million times, and then less than half a million times. As a result, China's tourism users have a great demand for tourism app, good acceptance and willingness to download, this also foreshadowed the market prospect of tourism app.

Figure 1. Tourism app downloads

4.2. Tourism App Rating
As shown in Figure 2, one star, two stars, three stars, four stars and five stars represent five levels of satisfaction, half the stars are in between. If the 2.5 star represents between dissatisfaction and general, then 0 star indicates that there is no user evaluation at present. From the diagram, The proportion of 4 stars and above is 71.11%, 2.22% below 2 stars, only three percent of the five stars, Users are basically satisfied with the comprehensive performance of existing tourism, but the number of highly satisfied app is grossly inadequate, better overall quality of tourism app applications. But the user's core needs are not deep enough, the development of tourism application still has great room for progress.

Figure 2. Proportion of tourism app ratings

4.3. Single Tourism App Service
For existing tourism app applications, the absolute advantage of providing a single tourism service is 91.11%. Based on the six elements of tourism and various aspects of tourism app application, Divide
the core functions of tourism app into navigation, Self-driving, Bus, Hotels, Food, Five categories of tourism service. The specific content distribution is shown in Table 1. For travel app applications, at the same time, 43.3 per cent of terminal services were provided. Only 56.7% of mobile terminal services, the gap between the two is small, analysis of tourism app findings that provide integrated services, apart from "Palm Air Travel" and "MyLoveHiking"," designed for hikers with airfare and hotel services. And the rest are travel portals that already have some visibility and user base on the PC side, moving its basic services from the Internet to the layout of the mobile Internet, such as Ctrip travel network "Ctrip travel, Yilong travel network" Yilong travel ", where to travel "and so on. In a single service tour, at the same time, only 45.12% of the final service is provided.

Table 1. Introduction to the core functions of various types of tourism offering a single service

| Core Functions   | Substance                                                                 |
|------------------|---------------------------------------------------------------------------|
| Navigation, self-driving | Map navigation services, road reminders, illegal inquiries and car rental information search |
| Mass transit    | Flight, train, coach, bus, subway reservation, taxi service               |
| Hotels, gourmet | Local hotel and food inquiries, reservations and experience sharing        |
| Travel service  | Travel group purchase and route introduction, destination travel recommendation, travel strategy inquiry, ticket booking, |
| Daily service   | Weather forecast, machine location enquiry, etc                           |

4.4. Travel Mode
This questionnaire is aimed at tourist users who have used tourism APP. Of the respondents, 27.7% often use travel app applications, sometimes 41.6% and occasionally 30.7%. It can be seen that only a few users are more enthusiastic about tourism app, most users have not used tourism app to inquire about travel information behavior habits, or cannot skillfully operate tourism and enjoy various services. In terms of tourism mode, only 16.8% of group tourism, 26.7% of self-driving travel and 56.7%. Among those surveyed using travel app, self-help tours have an absolute advantage, with a significant number of self-driving visitors, as shown in figure 3 below:

Figure 3. Proportion of travel patterns

5. Conclusion
The development of mobile Internet technology has made great changes in people's way of life. For the future development of tourism, mobile terminal application software has greatly facilitated
people's travel mode. The way of life of Internet tourism will be the inevitable trend of tourism development in the future. Nowadays, more and more tourism app applications also begin to pay attention to the needs of users, using the convenience of the Internet, tourism applications from the traditional single-function mode to multi-task, multi-function combination, all-round, multi-angle travel "escort ", Pay close attention to user demand and pain point, realize intelligent travel mode, and pay attention to how to optimize product operation flow, interaction and improve user experience. With the improvement of living standards, traveling out has gradually become the normal life of people. The tourism mode of "smart travel" not only solves the basic behavior needs of people going out, but also pays more attention to people's inner feelings. A good user experience must be exciting and pleasant to be full of surprises. Travel is used to enrich your life, make friends of the same interest, expand your social circle and make it a part of your life. In this diverse world, this lifestyle makes me feel like "fish to cat ", is the yearning for" temptation ", at the same time, artificial intelligence and virtual and reality technology develop rapidly, constantly refresh our cognitive depth of science and technology, folding and bending devices begin to sprout, under the condition of perceptible technology, will be a major breakthrough in product tactile interaction mode, not just visual, auditory and tactile interaction mode. Even in the sense of smell, when the user interacts with the product to complete an operation or task, the product interface also presents a dynamic picture of celebration and releases a pleasant taste, And in the sense of smell feedback to the user, so that the user in the real situation, in such an interactive way to surprise the user. Of course, the vision of future product interaction needs further study in the future.

References
[1] Diharto A K , Ismail Y , Iriantini D B , et al. The role of community based tourism based on local wisdom using online media. International Journal of Civil Engineering and Technology, 2018, 9(2):908-915.
[2] TGR. Maud P, Sukawati Building a Sustainable Competitive Advantage of Tourist Destination in Central Kalimantan by Batangharin as a Value of Local Wisdom Journal of Hotel and Tourism Business ,2019,5(2):249-249.
[3] Lubis H,Rohmatillah N,Rahmatina D. Citing the report. Development Strategy of Tourism Village Based on Local Wisdom; and J. Isuso Saldane Nyiura ,2020,9(2):320-320.
[4] Brahimi T . Using Artificial Intelligence to Predict Wind Speed for Energy Application in Saudi Arabia. Energies, 2019, 12(24):4669-4773.
[5] Wismayani P G S , Wiswasta I A , Sumantra I K . Development of Goa Lawah Temple as a Spiritual Tourism Based on Local Wisdom. International Journal of Contemporary Research and Review, 2019, 10(2):21395-21400.
[6] Purnaya I G K , Laba I N , Semara I M T . PACKAGING LOCAL WISDOM-BASED RIVER TOUR. International Journal of Applied Sciences in Tourism and Events, 2019, 3(2):109-109.
[7] Hutson M, Artificial intelligence faces reproducibility crisis. Science, 2018, 359(6377):725-726.
[8] Azlan N A N , Lu C K , Elamvazuthi I , et al. Automatic Detection of Masses from Mammographic Images via Artificial Intelligence Techniques. IEEE Sensors Journal, 2020, PP(99):1-1.
[9] Guan M , Wu Z , Cui Y , et al. Efficiency Evaluations Based on Artificial Intelligence for 5G Massive MIMO Communication Systems on High-Altitude Platform Stations. IEEE Transactions on Industrial Informatics, 2020, 16(10):6632-6640.
[10] Lee J . Access to Finance for Artificial Intelligence Regulation in the Financial Services Industry. European Business Organization Law Review, 2020, 21(4):731-757.