Analysis the Application of Artificial Intelligence Technology in Smart Tourism

Jie Zhang(✉)

Dalian Vocational & Technical College, Dalian 116021, Liaoning, China
clear188@163.com

Abstract. This article discusses the basic content and artificial intelligence technology connotation, combined with the specific application of artificial intelligence technology in the collection and push of tourism information, artificial intelligence tourism interpretation system, intelligent scenic spot service system, intelligent tourism route planning and design, tourism administrative management efficiency, and tourist source development forecasting,through research to strengthen information and network security management, constantly improve relevant laws and regulations, ethical risk management. Its purpose is to improve the awareness of artificial intelligence technology application value level, promote the healthy development of intelligent tourism system.

Keywords: artificial intelligence technology · smart tourism · machine learning technology

1 Introduction

In 2014, "Smart Tourism" became a very hot topic in the tourism industry, and this year was also called the "Smart Tourism Year". The source of "Smart Tourism" can be traced back to the "Smart Earth" concept proposed by IBM in 2008, together with the "smart city" practice implemented at that time, coupled with the popularization of smart mobile terminals such as smart hands and tablet computers, it provides good conditions for the realization of smart tourism. In the construction of the smart tourism system, artificial intelligence technology has good application value. By combing the specific application of artificial intelligence technology in smart tourism, it has a positive significance for promoting the healthy economic development of the tourism industry.

2 Overview of the Basic Content of Smart Tourism

2.1 Basic Content

Smart tourism is also called intelligent tourism. It is to use new technologies such as cloud computing and the Internet of Things to actively perceive information on tourism resources, tourism economy, tourism activities, tourists, etc. through the Internet/mobile
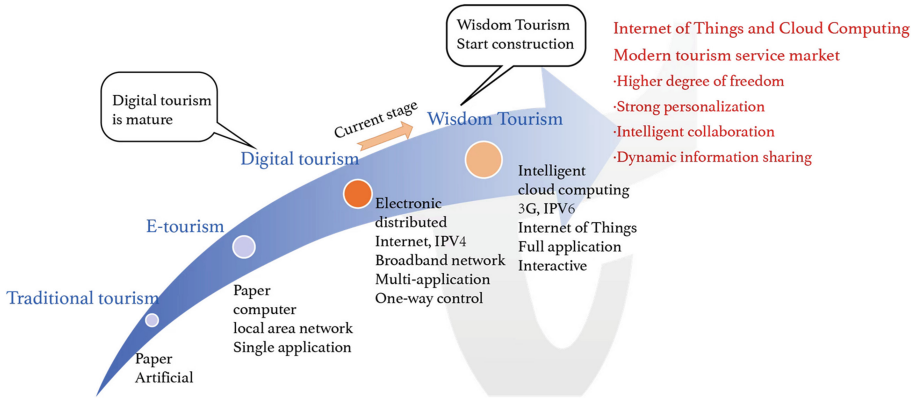
Fig. 1. The development process of smart tourism

Internet and with the help of portable terminal Internet devices. With this information, work and travel plans are arranged and adjusted in time, so as to achieve the effect of intelligent perception and convenient use of all kinds of travel information. The construction and development of smart tourism will ultimately be reflected in the three levels of tourism management, tourism services and tourism marketing. In its development process, it has mainly experienced four stages (as shown in Fig. 1), namely traditional tourism → e-tourism → digital tourism → smart tourism. Smart tourism in the current context relies on IoT technology, cloud computing technology and artificial intelligence technology have the characteristics of higher degree of freedom, stronger tourism personalization, higher level of collaboration, and higher level of information sharing, so as to provide more convenience for people's travel and meet people's management requirements for going out.

2.2   The Main Function of Smart Tourism

From the user's point of view, smart tourism has the following functions: First, the navigation function, adding location services (LBS) to travel information, allowing tourists to know their location at any time. There are many ways to determine the location, such as GPS navigation, base station positioning, WIFI positioning, RFID positioning, landmark positioning, and image recognition and positioning in the future. In the specific use, as the location changes, various information is also updated in time, and actively displayed on the web and map, reflecting the characteristics of directness, initiative, timeliness and convenience. Second, the tour guide function, while determining the location, will actively display surrounding tourist information on the web page and on the map, including scenic spots, hotels, restaurants, entertainment, stations, etc., to create convenient conditions for people to travel. Fourth, the shopping guide function, because it uses the mobile Internet, tourists can make reservations anytime, anywhere. Coupled with a secure online payment platform, you can change and formulate the next travel itinerary anytime and anywhere, and the convenience has been saved by more than 70% compared with the previous year.

3 Connotation of Artificial Intelligence Technology

3.1 Artificial Intelligence Perception Technology

In the application of artificial intelligence technology, intelligent perception technology is an important part, and its branch technology involves pattern recognition technology, natural language processing technology, computer vision processing technology, etc. ① Pattern recognition technology refers to the sorting and analysis of various characteristics of the characterizing things, in order to complete the work of description, recognition, classification and interpretation of things to meet the analysis needs of data parameters in different situations. Common methods include sentence recognition technology, statistical decision analysis technology, artificial neural network technology, etc. ② Natural language processing technology is a technology that uses computers to process written or spoken language information. The application involves automatic text recognition, machine translation, and automatic language synthesis. ③ Computer vision technology uses the basic principles of computers to sort out the image data, so as to find matching application materials in the object feature library to meet the corresponding use requirements.

3.2 Machine Learning Technology

In the artificial intelligence technology system, machine learning technology is a very basic content, and it is also a basic condition for the smooth deployment of artificial intelligence. In the application of this technology, it will develop learning algorithms to analyze and learn data obtained by sensors and data stored in databases, and then realize the self-evolution of the system. Each evolutionary upgrade will increase its intelligence by 10%–30%. It also makes the system's perfection and use value continue to improve to meet the corresponding use requirements.

3.3 Artificial Intelligence Reasoning Technology

In the artificial intelligence technology system, intelligent reasoning technology is also a very important component (the technical framework is shown in Fig. 2). In the specific reasoning design, the logical content needs to be sorted out. For artificial intelligence, it uses the logic includes classic logic (more than 70%) and extensible logic to meet application requirements in different situations. At the same time, it is also necessary to do a good job in search, its role is to better complete a certain application goal, and use this to complete continuous reasoning to meet the corresponding use requirements. In the application, intelligent activities can also be regarded as a process of "problem solving". In this process, explicit and invisible problems are processed or searched to obtain the required retrieval data to meet the application requirements. In addition, in the application of intelligent reasoning technology, an expert system will also be involved. In the application, this system will combine professional knowledge to deal with specific problems to meet the corresponding promotion and application requirements.
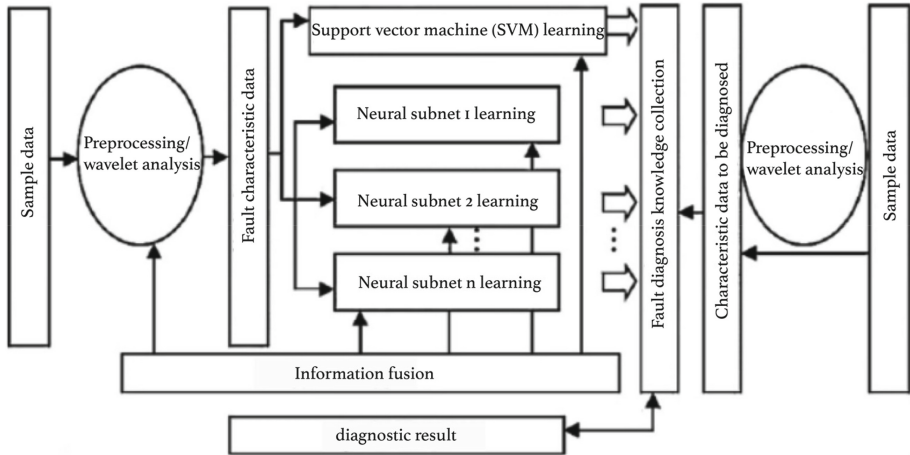
Fig. 2. The overall framework of the artificial intelligence inference system

3.4 Artificial Intelligence Action technology

In addition to the key technologies mentioned above, intelligent action technology is also an important component of the artificial intelligence technology system. In specific applications, intelligent action technology includes data mining technology, intelligent control technology, etc. In the context of the continuous improvement of the Internet technology system, big data has become the norm for development. It is difficult to meet the needs of social development just for data retrieval. How to better automatically obtain information has become a content that needs to be paid attention during the development period. The data mining technology used in it can also extract a large amount of data, condense the massive data into 30%–40% of data, so that it can better understand the law of data development and meet the corresponding use needs. In the application of intelligent control technology, it can also better promote the goal realization process, to improve the application value of the sorted data information.

4 Specific Applications of Artificial Intelligence Technology in Smart Tourism

4.1 Collection and Push of Tourism Information

From the perspective of application, artificial intelligence technology has a very good application in the process of collecting and pushing tourism information. In the specific application of technology, the picture information, language information, and text information of all kinds of things can be sorted, and then in the context of the application of intelligent reasoning technology, the information content can be compared and analyzed, and 70%–80% of the data can be filtered out in the next stage of collation. Under the application background of data mining technology and intelligent control technology, 30%–40% of tourism information is condensed again, and the communication project is

used to transmit the data to tourists, and the development of personalized tourism courses for tourists has a positive role in promoting. For example, a certain area uses artificial intelligence technology to sort the local basic tourist information according to the degree of popularity, and also sort out the individual needs of tourists, thereby increasing the matching degree of push information to 85%–90%, to improve the effectiveness of the pushed information [1].

4.2 Artificial Intelligence Tourism Interpretation System

From the perspective of application, artificial intelligence technology also has very good applications in artificial intelligence tourism interpretation systems. In the context of the application of big data technology, the interpretation information of scenic spots can be sorted, and the GPS positioning system can be used to locate the location of all scenic spots, so that intelligent interpretation can be launched according to the walking trajectory of tourists. Under normal circumstances, the tourism layout of scenic spots and museums will be divided into several functional areas, such as tourist areas, data storage areas, cultural heritage areas, etc. This also provides convenient conditions for the organization of knowledge points.

And in the application, natural language technology will also be used to process the voice, and machine translation software will be translated into multiple languages, such as English, Japanese, Korean, etc., to provide intelligent travel assistance for tourists from different countries. For outbound tourists, when encountering foreign language road signs, they can also use image processing technology and character recognition technology to complete text translation by taking pictures. The whole process can be completed within 0.1–1.0 s, to provide better services for outing travelers and meet the corresponding requirements [2].

4.3 Intelligent Scenic Service System

From the perspective of the application situation, artificial intelligence technology also has a good application value in the service system of intelligent scenic spots, which is also an important function of the application process of artificial intelligence technology. In the intelligent scenic spot service system activities, its content involves the hotel reservation service, tour reservation service, 3D preview service, etc. With the help of artificial intelligence technology, at the same time, the service content is sorted out, divided into several sections, and named. For example, large scenic spots can be divided into animal and plant viewing areas, animal viewing areas, amusement areas, etc. At the same time, public toilets, beverage shops, restaurants, souvenirs, entrance and exit locations will also be marked to provide convenience for tourists to travel, to better meet the corresponding use requirements and improve the satisfaction of tourists by 20%–30% [3].

4.4 Planning and Design of Smart Tourist Routes

In the practical application, the artificial intelligence technology also has a good application in the intelligent tourist route planning and design. In the application of artificial

intelligence technology, an electronic map intelligent service system can be established, tourists enter the starting and end points to obtain the corresponding traffic suggestions, and provide aircraft, trains, buses, bicycles, subways and other lines for tourists to choose. In order to facilitate the choice of tourists, some detailed information will also be provided in the route planning and design, such as the loss of time of various means of transportation, passing stations, etc., which can also provide more valuable help for tourists to choose travel routes, so as to provide convenient conditions for tourists to travel. At the same time, in the planning of tourist routes, some scenic points along the routes will also be marked, and the appropriate tour time is proposed, so that the screening efficiency of 30%–50% of tourists can meet the corresponding use requirements of [4].

4.5   Tourism Administrative Management Efficiency

In practical applications, artificial intelligence technology also has a good application in the efficiency of tourism administration. In the application of artificial intelligence technology, a dynamic service system for tourism administration management can be established. Tourists can input the problems encountered during the tour and make notes in the system. For content that accounts for more than 10% of questions, it will be made into an automatic response mode. After visitors ask questions, they can give feedback as soon as possible, which can also increase tourist satisfaction to more than 85%. To better meet the application requirements. At the same time, with the assistance of artificial intelligence technology, the tourism management department can also quickly communicate with tourists. Some problems that cannot be resolved at the time, such as ticket sales disputes, tourism rights disputes, etc. will be notified to the management staff as soon as possible, and they will also rush quickly to the scene to resolve the contradiction between the two parties as soon as possible, and increase the problem handling efficiency to more than 80% [5].

4.6   Forecast of the Development of Source Areas

In addition to the above-mentioned application content, artificial intelligence technology also has very good applications in the development and prediction of customer source. Based on the data collation results obtained by artificial intelligence technology, the accuracy rate exceeds 95%, which lays a good foundation for administrative management service. In the context of artificial intelligence technology applications, genetic algorithms, fuzzy time series, rough sets, and other methods can be used to sort out the collected big data, to mine 30%−50% of the value data, and build predictive models around the application data to predict the future development of the tourist source market. When tourists choose scenic spots, they will also arrange their personal travel time based on the hot spots and the best time to visit based on big data statistics, so as to bring a better tour experience and improve the tourist impression of the scenic spot [6].

5   Matters Needing Attention When Applying Artificial Intelligence Technology in Smart Tourism

5.1   Strengthen Information and Network Security Management

By strengthening information and network security management, the confidentiality of the transmitted information can be improved and the probability of information risk leakage can be reduced. The smart tourism management system based on artificial intelligence technology, while providing convenient conditions for people to travel, also faces the risk of information leakage. If it is not protected, it will directly affect the relevant rights and interests of tourists and bring unpredictable loss. In this regard, it is also necessary to strengthen technical protection in actual work, such as firewall technology, identity authentication technology, code recognition technology, etc., so that it can better resist the negative impact of vicious attacks and form a more secure smart tourism service environment, so as to provide tourists with more convenient service content [7].

5.2   Continuously Improve Relevant Laws and Regulations

Through continuous improvement of relevant laws and regulations, it can provide effective guarantee for the integration of artificial intelligence technology and provide reliable help for the improvement of the intelligent tourism system. In specific practice, first, do a good job of clarifying the conceptual boundaries, and use this to do a fine management, improve the standardization and timeliness of the results of deep-level problem handling, to lay the foundation for the advancement of related work [8]. Second, in the process of establishing laws and regulations, it is also necessary to ensure that the contents of the laws and regulations established are systematic and comprehensive. For example, relevant contents at the national management level, local level, and user level need to be detailed in the specifications. This can also lay the foundation for the orderly promotion of related management activities, and at the same time create good conditions for the healthy and sustainable development of smart tourism.

5.3   Do a Good Job in Ethical Risk Management

By doing a good job in ethical and moral hazard management, it is possible to reduce the negative impact of the application of artificial intelligence technology and increase the application value of artificial intelligence technology. In the application of artificial intelligence technology, there are some ethical risks, such as human voice processing, handwriting forgery, portrait modification, etc. The emergence of these risks will also directly affect people's life safety and social stability. In this regard, it is necessary to strengthen supervision work to create a safer and more comfortable network environment [9].

6   Conclusions

In summary, strengthening information and network security management can improve the confidentiality of information transmitted, and constantly improve relevant laws

and regulations, which can provide effective guarantees for the integration of artificial intelligence technology, manage ethical risks, and reduce the negative impact of artificial intelligence technology application. By applying artificial intelligence technology to smart tourism activities, it is of positive significance for optimizing the smart tourism service system and promoting the healthy development of the industry's economy.

References

1. Zhang ZC, Huang P, Long Y, Li ZZ (2021) Model construction of a smart tourism integrated system based on artificial intelligence. Sci Technol World 12:10–12
2. Zou MX (2021) On the application and influence of smart technology in international hotels in the era of smart tourism. Manag Technol Small Medium-Sized Enterp (First Issue) 04:178–179
3. Xie QX, Su HW, Tan RH, Lin XM, Wang SY (2021) A review of intangible cultural heritage tourism research based on artificial intelligence. Sci Technol Innov 05:108–109
4. Wang J (2020) Discussion on the application of artificial intelligence technology in smart tourism. Manag Technol Small Medium-Sized Enterp (Early Issue) 09(173–174):177
5. Yang JC (2020) Research on the application of artificial intelligence tour guide products based on user experience. Beijing University of Posts and Telecommunications
6. Deng J (2020) Research on the application of artificial intelligence technology in the construction of smart tourism system. Tour Overview (Second Half Month) 04:17–18
7. Ji JQ (2018) The application of artificial intelligence in tourism information services. Contemp Tour (Golf Travel) 08:40–42
8. Li JQ (2018) The application of artificial intelligence technology in Qingdao tourism. Electron Technol Softw Eng 09:247
9. Li GZ (2017) The application of artificial intelligence technology in smart tourism. Autom Instr 12:225–227