The Application of Artificial Intelligence Technology in the Tourism Industry of Jinan

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Abstract. With the rapid development of Internet, the technology of Internet of Things and Artificial Intelligence has been rising in recent years, which makes the traditional operating models and industry structure face new challenges in various fields. The technology of artificial intelligence has changed our life in many aspects, such as tourism, medical treatment, education, manufacturing, life style, and so on. Based on the analysis of the application of artificial intelligence in people's life, this article focuses how AI technology to lead the upcoming changes in the tourism industry of Jinan. The contribution of this article is to enhance the development of Jinan’s tourism industry.

1. Brief Induction of Artificial Intelligence and Smart Tourism

1.1 The Concept of Artificial Intelligence

Artificial Intelligence (AI) is a new technology science that studies and develops theories, methods, technologies and applications to simulate, extend and expand human Intelligence.

In computer science, artificial intelligence (AI), is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans and other animals. Computer science defines AI research as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals (Wang, 2015).

Artificial intelligence is a branch of computer science. For scientists, the purpose of studying artificial intelligence is essentially to understand the essence of intelligence and to produce an intelligent machine that responds in a new way similar to human intelligence. The research areas of AI include robotics, language recognition, image recognition, natural language processing and expert systems. With the development of this technology, the application of artificial intelligence in real life is becoming more and more valued.

The components of artificial intelligence mainly include: input device, arithmetic unit, memory, controller and output device. There are only two parts of AI that are connected to the outside world, the input device and the output device. Most input devices use sensors to simulate human organs, such as infrared sensors, sonar sensors, etc., in order to simulate the human visual system. This kind of sensor can realize the perception of the position of the monitored object. If the service object appears within the range that the sensor can sense, each "eye" will give different responses in the system. For output devices, the forms are mostly images, sounds, texts, video, etc. It is worth mentioning that, different from other ordinary robots, there is a special form of artificial intelligence output -- facial expressions. If the silicone material with a high degree of imitation is used to simulate human skin, then the facial expression of artificial intelligence will show a more human-like state, so the output device is also called "effector organ". The arithmetic unit mainly processes and analyzes the data,
obtains the data from the memory, and then carries on the necessary computation and the processing after these data, the processing result returns to the memory. Memory is used to store data. It has the function of "memory". After the input device collects information from the outside world, the information will be converted into data that can be recognized by the computer and then stored. The data is then sent to a place where it needs to be processed, such as an arithmetic unit or controller. After all the data is processed, the final result is sent to the output device (Xiao & Zhong, 2015).

1.2 Smart Tourism

International business machines corporation (IBM) first put forward the concept of "smart tourism" in 2008. After that, the traditional tourism industry was rapidly integrated with the Internet, Internet of Things, cloud computing and AI technology. Not only that, China once proposed to make China's tourism realize informatization and modernization in 2011. In addition, with the implementation of the "Internet +" action plan proposed by the state council in 2015, the application of the Internet and automatic control technology has attracted growing attention. The information-transmission characteristics of tourism and the popularity of smart mobile terminals, such as smart phones and tablet computers, lay a foundation for the proposal of smart tourism. Based on information and communication technology, smart tourism is a systematic and intensive management reform to meet the personalized needs of tourists, providing high-quality and satisfactory services, and to realize the sharing and effectively utilizing tourism resources and social resources.

The core technologies of smart tourism are cloud computing, Internet of things, mobile terminal communication and artificial intelligence. The four core technologies of smart tourism are related and integrated inherently, which forms the overall technical framework of smart tourism in which artificial intelligence is an important part of the core-technology framework of smart tourism, and the core and link of intelligent tourism. Artificial intelligence is the key technology to effectively handle and make full use of the rich tourism information resources and to integrate the fragmented and independent application system of tourism industry.

2. Development of Artificial Intelligence and Smart Tourism

China's AI industry is developing rapidly, and many technologies such as speech recognition, visual recognition, machine translation and information processing are at the leading level in the world. Breakthroughs have also been made in intelligent chips and deep learning. The development of artificial intelligence technology and Internet technology has profoundly changed our life. It will greatly improve our efficiency and improve our living standard in various fields. The superposition of intelligent factories, intelligent production, human-computer interaction, 3D technology, machine recognition, Internet of things, big data, and cloud computing and other technologies has ushered in a new wave of technological revolution.

At present, artificial intelligence has been well used in industrial production, intelligent tourism, medical treatment, education and other aspects. The development of artificial intelligence has brought opportunities and challenges to the tourism industry. With the maturity and application of Internet of things, cloud computing, big data, deep learning and other technologies, smart tourism emerges at the historic moment. With the help of artificial intelligence technology and artificial intelligence products, tourism service, tourism management, tourism development, tourism experience, tourism marketing and other aspects of the overall upgrade, promote the transformation and upgrading of tourism to the direction of comprehensive services and personalized customization, to give users a better tourism experience.

3. Upgrading the New Operating Model of Tourism in Jinan by AI

Technology changes the life style of people. “Artificial intelligence technology + tourism” is a new cross-border integration of science and technology and tourism industry, which will definitely redefine people's travel mode and travel experience. At present, many domestic scenic spots have made beneficial attempts and achieved good social and economic benefits, such as the introduction of smart hotels and virtual reality scenic spots. In particular, the strong coverage of wireless network in scenic spots, the full coverage of high-tech technologies such as the Internet of things is the material basis of
smart tourism.

3.1 To Create a Mobile App Tour Guide Model Based on the Internet Platform

Introducing the products of artificial intelligence, such as robots, to replace artificial services. Robot guides, for example, can recognize the languages of many countries and even the dialects of many regions, which shows that AI has the advantage which is impossible for the human guides to achieve. The personnel guidance of scenic spot and other kinds of the service also may be done by the intelligent robot. Traditional tour guides are required to have comprehensive qualities and high requirements. As for the national important tourist attractions or venues, traditionally, the guides are required to master multiple languages and have an understanding of cultural background and other knowledge of these venues. In addition, reasonable travel route planning, travel arrangements are essential. Artificial intelligence is different from traditional tour guides. If artificial intelligence is applied to tour guide, it will greatly reduce human, material and financial resources.

First of all, according to the big data of the number of former visitors in each scenic spot or venue, the guide will provide a more reasonable travel plan for everyone. In the aspect of route planning, the satellite positioning system can be used to provide the scenic spots worth visiting to tourists in the form of graphics, text and sound, so that tourists can have more reasonable travel choices. At the same time, the current number of tourists in each scenic spot can be displayed in the form of graphics and Numbers (Wang, 2015). In terms of language, the languages of many countries can be stored in order to communicate with tourists from different countries and provide better services.

Secondly, we can store these accurate data into the memory of artificial intelligence for the historical background, details and other contents of specific scenic spots or cultural relics. When someone consults with the robot or the robot guides prepare for introducing the scenic spot, the relevant content can be taken out by calling the corresponding program, and then the content can be output in the form of audio through the adjustment command of the controller. As Jinan, the capital of Shandong province, with the token name as “Spring city” because there are so many springs there, has rich in tourism resources, numerous attractions, relying solely on the manual guides to explain the attractions is greatly restricted. Using the combination of mobile phone positioning system and scenic spots, with the help of voice recognition system, a large number of free multifunctional voice translators are provided, so that tourists from all over the world can timely and accurately listen to the tourist attractions they are visiting. Visitors can check the history and culture of Jinan from the APP, especially the 72 springs in Jinan, information of celebrities, life stories, architecture and historical origin of scenic spots. Tourists also do not have to hire a guide to explain, because in each scenic spot, scenery, there is a dedicated QR code. As long as the tourists open the mobile phone to scan it, they can immediately hear the sweet voice, broadcast professional explanation of scenic spots. Foreign tourists can choose the voice conversion function and listen to the explanation of scenic spots in their own language. When conditions are ripe, we can consider providing free voice translator, so that foreign tourists can freely communicate with Chinese people. Use artificial intelligence technology to create virtual reality visual experience in cultural tourist attractions. Virtual visual experience can jump out of many virtual images to explain, or interact with tourists to play games, increase the sense of participation and experience of tourists. The unique feature of interactive scroll is that it not only allows people to return to the historical landscape, but also makes people feel like crossing the long river of history through interactive experience.

3.2 To Shape a New Marketing Model of AI Tourism

In the tourism industry, traditional marketers are often criticized for their single way of promotion and non-transparent marketing methods. By using artificial intelligence to make part of the operation plan to be open and transparent, it would be easy to win the trust of tourists soon. At the same time, unlike traditional marketing personnel, artificial intelligence can communicate with tourists properly through facial and language recognition system, which can improve the language barrier brought by face-to-face communication or poor purchasing experience caused by personality differences. A witty style of conversation and appropriate techniques can be used to shift the focus of travelers to merchandise. In this link, the feedback control system in the automatic control system needs to be used
a lot, and different responses need to be made according to the response of passengers in real time. The machine learning, deep learning and fuzzy learning functions of artificial intelligence are applied to create the best travel route recommendation for passengers through the APP. Machine learning is the study of computer simulation of human learning behavior to obtain new knowledge or skills, the use of artificial intelligence in all fields. With the help of machine-learning technology, we can timely push the best travel routes to tourists and create personalized travel services.

In addition, the function of landmark positioning and the technology of information recognition are used to create smart maps to help tourists travel better. Smart map can provide tourists with practical information such as surrounding scenic spots, accommodation, catering, gas stations, parking lots and public toilets, so as to facilitate tourists' choice, analyzing tourists' travel information and recommending travel itinerary, providing real-time road conditions and instant traffic information to avoid traffic congestion and to improve travel efficiency.

3.3 To Complete the Scheduling Task Mode in Tourism by AI

The rapid development of information technology and tourists' demand for information services promote the rapid development of smart tourism. Artificial intelligence technology is the core technology of smart tourism and plays an important role in promoting the development of smart tourism. Artificial intelligence technology is conducive to the collecting and searching of tourists' tourism information and spreading tourism information of tourism business operators. It is helpful to promote the intellectualization of tourism interpretation system and the reform of hotel call service. At the same time, artificial intelligence technology plays an important role in promoting the prediction of the number of tourists, the improvement of scenic spot management quality, tourism administrative management efficiency, and intelligence of tourism route planning.

Traditional dispatchers need to spend a lot of manpower and material resources and the scheduling effect and speed are often not satisfactory. Replacing traditional dispatchers with artificial intelligence can significantly improve the rescheduling time. The real-time image-transmission system is set up in each scenic spot. Robots in each scenic spot convert these images into data, and then obtain the calculation results through analysis and processing, and analyze the human flow at various points. The artificial intelligence of each scenic spot and the artificial intelligence of the general dispatch room establish communication through the communication protocol, upload the data to the general dispatch room and then complete the real-time information transmission, and to complete the scheduling task finally.

3.4 To Build a Tourist Safety Mode by AI

People pay increasing attention to the safety problems in travel, but the safety guarantee mechanism of tourists in traditional tourism is still not perfect. When a safety accident occurs, the call center cannot respond in the first time, so that tourists can bear more risks, so it is necessary to apply the artificial intelligence in the link of call center, especially in the weak security link of each scenic spot. When there is a security accident, the robots in each accident place can upload the detailed data of the accident to the call center in time, and the artificial intelligence of the call center will react immediately after receiving the alarm signal to call for help and give an alarm, so as to ensure the personal safety of tourists to the greatest extent. With the continuous development of artificial intelligence technology and the internet of things and other technologies, the application of artificial intelligence in real life will become more and more mature. At the same time, the application of artificial intelligence in modern tourism will also be a new development trend.

Relying on the big-data analysis technology of artificial intelligence, the intelligent service of tourism can be realized, which can complete scenic relying on big data technologies, for examples, early warning of scenic passenger flow fluctuation, analyzing the causes and affecting factors that lead not to complete the task of before, and the scenic area marketing planning, public security, transportation, industry planning, scenic area of public service system, and so on, which form an Information Sharing System. This system is combined with the tourism information data form to predict early warning mechanism, to improve the ability of emergency management, tourism security, realizing the intelligent service (Zhang, Li & Liu, 2012).
In a word, the artificial intelligence technology has become an important engine for the development of modern tourism and has penetrated into every link of the tourism industry. With the vigorous development of cloud computing, mobile Internet, Internet of things and other technologies, as well as the supporting of policy from the government, the artificial intelligence technology may fundamentally subvert the model of operation and management and the model on profit in the traditional tourism industry. Implementing AI technology can comprehensively improve the tourists’ experience and management level.

For developing the tourism industry of Jinan, an information platform should be laid out on the basis of current situations of Jinan, which builds a communication bridge between tourists and tourism enterprises to make full use of artificial intelligence technology, leading to transforming and upgrading the tourism of Jinan comprehensively.

4. References
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