Research Article

Marketing Strategy of Rural Tourism Based on Big Data and Artificial Intelligence

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In recent years, with the rapid development of artificial intelligence technology and big data application and the continuous optimization of algorithms such as deep learning algorithms and reinforcement learning algorithms, tourist attractions using "smart tourism" technology can obtain more accurate and in-depth knowledge from tourism big data and mine the value behind the data. As an important branch of tourism, the rise of rural tourism has inspired rural areas to protect the local environment, inherit characteristic culture, develop tourism resources, develop tourism economy, and increase rural income, which has well responded to the call of the rural revitalization strategy. However, due to lack of information resources and technology, some rural scenic spots still adopt traditional marketing methods without the support of big data and artificial intelligence technology. This paper proposes a research work on the marketing strategy of rural tourist attractions based on big data and artificial intelligence, analyzes current application of big data and artificial intelligence in rural tourism, and discusses the transformation of rural tourism marketing to a new fusion model with the support of big data and artificial intelligence, aiming to study every step involved and supported deeply by big data and artificial intelligence, from the awakening of intentions before the travel to the analysis of behaviors and preferences during the travel and the collection of evaluation after the travel. The research results of this paper show that more sufficient and deep integration between rural tourism and artificial intelligence/big data are needed to make tourists get better tour experience and marketing strategy of rural scenic spots to get better effects and income.

1. Introduction

In recent years, the modern information society has entered the era of big data, and big data has rapidly developed into a popular category favored by academia and industry, and it has been widely used. With the rapid development of technology in the field of artificial intelligence in recent years, the technology in the field of artificial intelligence itself has high uniqueness and complexity. For the 2021 London Olympics, Teradata used big data to help citizens plan their travel via a dedicated website by sifting through and creating target emails. This enabled people to avoid the crowds of the games accurately and changing the travel decisions of nearly 35% of people. The use of big data to guide people to make travel plans also greatly alleviates the traffic pressure in London, improves people's travel experience, and helps tourists to make scientific evaluation of their travel [1].

Although artificial intelligence covers a wide range of fields, at this stage, the main force driving the progress of artificial intelligence lies in the improvement of various artificial intelligence basic algorithms, such as Artificial Neural Network, Bayesian, Decision Tree, and Association Rule Learning, and the combination of these algorithms with specific scenarios. With the popularization of Internet technology across the country, the role of big data and artificial intelligence in promoting the development of rural tourism is becoming more and more obvious. With big data as the background, it is an excellent opportunity for the development of rural tourism. However, there are many deficiencies in the marketing of rural tourism: the concept is not updated, the methods are traditional, and the methods are old-fashioned, which restrict the sustainable development of rural tourism to a certain extent.

Tourism is an industry with great development potential. Giving full play to the advantages of big data analysis technology and artificial intelligence to realize rural smart tourism can inject new impetus into the development of rural areas. Through the development of rural tourism in rural areas, it is helpful to combine the primary and tertiary industries, drive the development of the local economy, increase the income of farmers, and promote the multi-functional development of agriculture. We analyze the current marketing situation and existing problems of rural tourism in order to find a suitable marketing strategy to boost the development of rural tourism and improve the economic and social benefits of rural tourism. Rural tourism research based on big data analysis technology can not only realize the sharing of tourism information resources but also deeply mine tourism data resources. Let the tourism industry achieve precise marketing before tourists travel, enjoy refined and considerate services during tourists travel, and get comfortable after-sales experience after tourists travel, which has made a huge contribution to the future development of the tourism industry.

The innovations of this paper are (1) this paper combines the needs of industrial policy and the development trend of artificial intelligence and proposes an extended "technical" extension to build a new marketing model. (2) The research in this paper discusses the application of the efficient storage and management of big data and provides new ideas for the marketing strategy of big data for rural tourist attractions. (3) This research builds a novel fusion model of artificial intelligence, big data technology, and rural tourism marketing.

2. Related Work

With the development of economy and technology, the role of big data and artificial intelligence algorithms in promoting the development of rural tourism has become more and more obvious, and many scholars have carried out research on this. Artificial intelligence technology has been well applied in big data analysis such as data classification. Zhang analyzed the application of support vector machine methods in machine learning to multiclassification problems [2]. Yao et al. initially conducted joint research on the design of the measurement matrix and the signal reconstruction algorithm [3]. With the development of the Internet and big data, we have ushered in the era of massive data, which makes people urgently need to mine important information from a large amount of data, and data mining can develop rapidly. For the abnormal detection of image data, Wen proposed a new artificial intelligence hybrid algorithm to optimize the processing and realize the rapid detection and identification of abnormal data points [4]. Starting from big data and artificial intelligence technology, using machine learning and deep learning in artificial intelligence, Chen and Xu used Python to obtain various tourist behavior data to build an intelligent tourism big data analysis model based on artificial intelligence [5]. Based on artificial intelligence technology, the strategy of transformation and upgrading and sustainable development of eco-agricultural characteristic tourism is analyzed in many aspects by Li, and new

science and technology are integrated into agricultural tourism to drive innovation and upgrade the agricultural tourism industry and promote the development of eco-agricultural tourism [6]. Yu studied and designed the intelligent tourism management system. The whole system used Java EE technology to realize the business process of the whole system, used UML to analyze and model, designed the whole system based on the determined business function modules, gave the detailed architecture design content, analyzed the whole tourism data, and made it convenient to determine better tourism policy [7]. Niu tried to introduce big data technology in tourism, service, marketing, management, and other fields, leading the development of tourism towards intelligence and information [8].

However, the shortcoming of these studies is the uncertainty of data quality, and the calculation and analysis of massive data are very complicated, so the research data aspects still need to be improved. Meanwhile, with the support of big data and artificial intelligence technology, the analysis of the composition of the new mode of rural tourism marketing strategy is not specific and profound, and the way of the integration of big data and artificial intelligence and rural tourism marketing needs further research.

3. Artificial Intelligence Algorithms and Big Data

3.1. Artificial Intelligence Algorithms. The core competitiveness of artificial intelligence invention lies in the creative improvement of algorithms and the progress of the times. The development process of algorithms can also be called the development process of artificial intelligence technology. Artificial intelligence exists in daily life, and intelligent robots, food delivery software, etc., all use algorithms to improve service efficiency [9]. The rapid development of artificial intelligence in recent years is closely related to the rapid development of intelligent algorithms, so "intelligent algorithms" are also called the soul of artificial intelligence.

Artificial intelligence is a grand concept as long as tools have a way to imitate human learning, which is artificial intelligence. If there is a connection between the data, the weight of the connection coefficient in the network will increase, and if there is no connection between the data, the weight will increase. The system continuously adjusts the weight of the connection coefficient through the above process, and after thousands of times of learning, an algorithm with predictive function is formed [10]. For example, predicting which consumers have more purchasing power in the travel market? Which products will sell more next month? Then, tourism operators can be targeted to increase the advertising of certain products or increase advertising to some consumers.

With the development of artificial intelligence technology, the manifestations of artificial intelligence algorithms are very complex, some of which are very similar to the manifestations of traditional computer program algorithms, and some have very huge changes. Even professionals in the technical field cannot predict the changing direction of the algorithm form [11].

In recent years, with the introduction of artificial intelligence algorithms, especially machine learning and deep
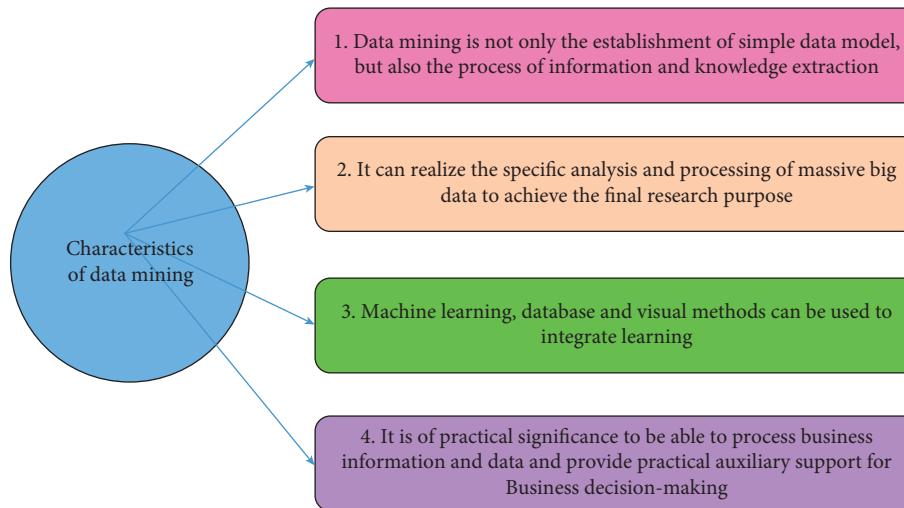
FIGURE 1: Data mining feature map.

learning, the enhancement of the computing power of computer equipment and the large amount of data accumulated by the outbreak of the Internet industry, artificial intelligence technology, and artificial intelligence-related industries have developed rapidly [12].

3.2. Big Data. Big data is made up of data reports from different aspects. With the technology development, the volume of big data has increased from the previous TB level to PB level. Various tourist guides, itineraries, and hotel information released by WeChat and the microblog of travel experts on the Internet are increasing the volume of big data. Big data types are diversified, including text, pictures , videos, and so on. But not all data are highly valuable. Some video plays for a long time, but only a few minutes or even a few seconds of data are efficient and effective data.

In the context of big data, data mining has become a way to realize the value of big data. Only through data mining technology can the value contained in big data be transformed into something useful. To some extent, big data is another term for data mining [13]. Data mining is an interdisciplinary topic in many fields, including comprehensive databases, mathematical statistics, artificial intelligence, and machine learning. The characteristics of data mining have the below points (as show in Figure 1). Data mining is a multistage process not only a modeling process but also a step-by-step data exploration process. This application can greatly improve the efficiency of data processing and reduce the probability of deviation.

4. Analysis of Rural Tourism Marketing Based on Big Data and Artificial Intelligence

4.1. Current Status of Big Data and Artificial Intelligence in Rural Tourism

4.1.1. Low Level of Informatization Hardware in Rural Tourism Scenic Spots. The economic level of some rural areas is low, and the operation status of tourist attractions is poor, so it is unable to attract domestic and foreign funds to further build the smart travel in rural tourist attractions. Especially in the rural tourist attractions in the central and western regions in China, most of them still adopt the original manual ticketing mode, and the resources in the scenic areas are mainly primitive natural landscapes. There is no big data collection and management and no data sharing platform either. For such scenic spots, it is impossible to collect tourists' data and carry out scenic spot marketing strategies with big data.

Other rural scenic spots with better economic conditions have built intelligent tourism data platforms under the guidance of the government, but these platforms are mainly aimed at collecting data to support scenic spot management not at the development of marketing strategies. The lack of marketing function means the revenue capacity of scenic spots can not be developed.

4.1.2. Short of Effective Mining Methods with Big Data Technology. Big data mining mainly includes association analysis, classification, clustering, regression, decision tree, and sequence analysis. At present, it is difficult to use these methods to mine tourism data to get very accurate results. The volume of tourism data itself is very large [14]. Tourists release various tourism guides or share tourism information through different social platforms. As time goes by, a large amount of tourism data is accumulated. The data can exist in a variety of forms, such as text, pictures, or videos [15]. No matter it is a picture or an evaluation, such unstructured data are difficult to be directly qualitative, and any deviation is highly likely to have an impact on the formulation of tourists' travel plans [16].

4.1.3. Insufficient Integration between Rural Tourism and Artificial Intelligence/Big Data. At present, the integration of rural tourism with artificial intelligence and big data mostly focuses on the data collection of tourists in the process of travel, which is analyzed according to the behaviors of tourists in the tour process. The integration level only stays in the analysis of behavior and preference in the travel process,

which greatly restricts the formulation and in-depth development of the rural tourism marketing strategy [17]. The objects of big data mining should include all kinds of data before, during, and after travel in order to get the data in the whole travel process, but these data involve a very wide range, and it is very difficult to fully mine them.

4.1.4. Rural Tourism Operators' Perception of Business Development with Big Data and Artificial Intelligence Is Moderate.

Some rural tourism operators do not show much interest in the use of big data and artificial intelligence due to their small scale of operation and insufficient understanding of smart tourism. They tend to use traditional tourism sales and marketing methods [18]. Although many rural scenic spots have begun to use big data and artificial intelligence skills, most of them exist as independent tourist attractions and do not participate in intelligent tourism platforms in the whole region. The big data platform should also be associated with the government, meteorological department, transportation department, and other departments to provide smooth and better service to tourists. For example, by sharing the data with the transportation department and meteorological department, the scenic spot can master the road conditions and weather conditions around the scenic spot immediately and inform tourists together with the marketing plan. For example, it will soon rain, so the scenic spot could immediately deliver weather warnings to tourists and recommend surrounding hotels according to tourists' preferences. However, there are many departments involved such as the transportation department and meteorological department, so the platform construction is very difficult and need more investment [19]. The poor effect and high investment make more rural tourism operators afraid of using big data and artificial intelligence technology.

4.2. The Marketing Strategy of Rural Tourism.

The most important feature of rural tourism is that tourists should be highly involved and deeply integrated into the specific activities of tourism, and can more naturally and closely contact the tourism environment [20]. This paper explores new rural tourism products and rural tourism models by integrating the existing tourism resources and facilities. The first step is to create products that consumers are interested in. Secondly, the consumers will be attracted by the products with effective price strategies and promotion strategies. Finally, more and more consumers will come to the rural spots to enjoy the holiday and boost the development of rural tourism. Some successful experiences with smart tourism technology were used for reference in the analysis process, and they not copied but improved and utilized according to the reality of rural tourism, aiming to promote the healthy and sustainable development of rural tourism. Figure 2 shows the transformation of the rural tourism marketing model.

4.3. The Contrast with the Traditional Marketing Model.

Traditional marketing methods only rely on experience and a small amount of data to obtain customer needs. Requiring a large amount of manpower and material resources, the results are not necessarily satisfactory to both tourism service providers and tourism service experiencers [21]. In the process of obtaining customer needs, the real needs of tourists cannot be fully explored and mined, and various tourism resources cannot be integrated.

With the development of artificial intelligence technology, the rural tourism marketing strategy based on artificial intelligence and big data can reasonably and efficiently integrate tourism resources, accurately find tourist needs, and provide tourists with the best and most suitable tourism services. Smart tourism has become an important development direction of the tourism industry [22]. Through the comprehensive application of big data, artificial intelligence, and other technologies, tourists can have a subjective perception of tourism information, and adjust and arrange their travel plans according to the specific information. For example, tourists could buy the tickets from the intelligent ticket purchase system before the travel, see the attractions via intelligent voice navigation before the travel, know how to park via the intelligent parking system before the travel, etc. According to the different needs of tourists, the operator will provide tourists with more warm and thoughtful services, improve the overall image of rural tourism, reduce the queuing time of tourists, and create better tourism service experience for tourists [23].

4.4. The Fusion Model of Artificial Intelligence, Big Data Technology, and Rural Tourism Marketing.

Big data has been integrated into the daily life of modern people [24]. Various behaviors of modern people, such as searching, inquiring, booking, and writing, will generate a large amount of data, which is crucial for the development of tourism. Some tourism operators will collect users' information through a questionnaire survey, and by analyzing the user data, they can recommend appropriate tourist attractions and travel modes for users and provide personalized customized tourism services for users according to their preferences and characteristics [25]. Tourism operators can also collect review data, establish a special database, and use artificial intelligence technology to understand the consumer's psychology and behavior to improve and innovate products, so as to improve the service quality and gain profits from them. Figure 3 shows the fusion model of artificial intelligence, big data technology, and rural tourism marketing. This fusion model shows the process of data collection, analysis, and application, and analyzes the forms of tourism big data and artificial intelligence application and marketing effects generated by these forms from three stages: before the travel, in the travel, and after the travel.

4.4.1. Before the Travel: Precision Marketing.

Through 3D modeling and VR technology, the comprehensive three-dimensional map of rural scenic spots will be presented via Internet to tourists before they travel. By using digital resources, the natural characteristics and cultural characteristics of scenic spots as well as the characteristics of "Restaurant, Home stay, Shopping and Entertainment" will be transmitted
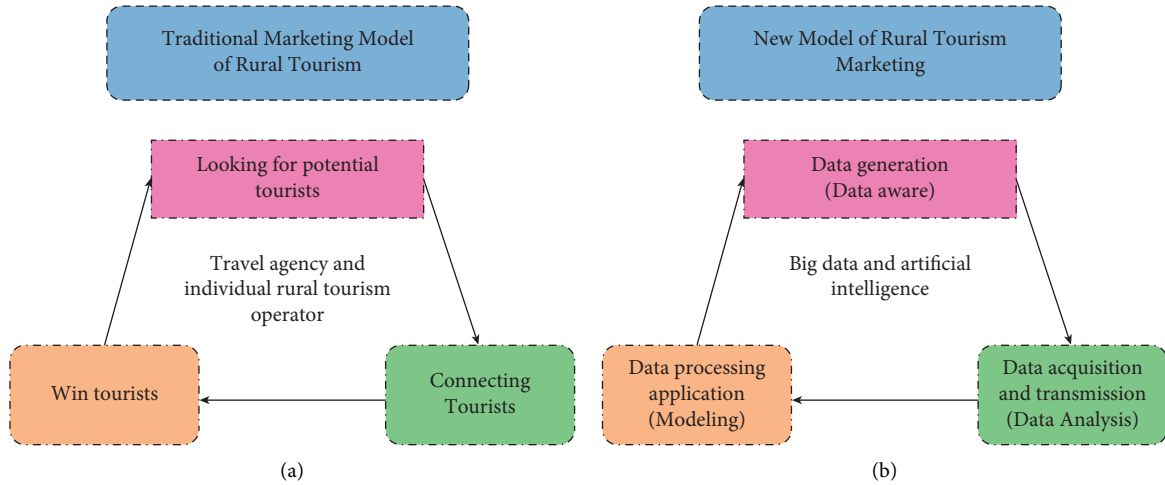
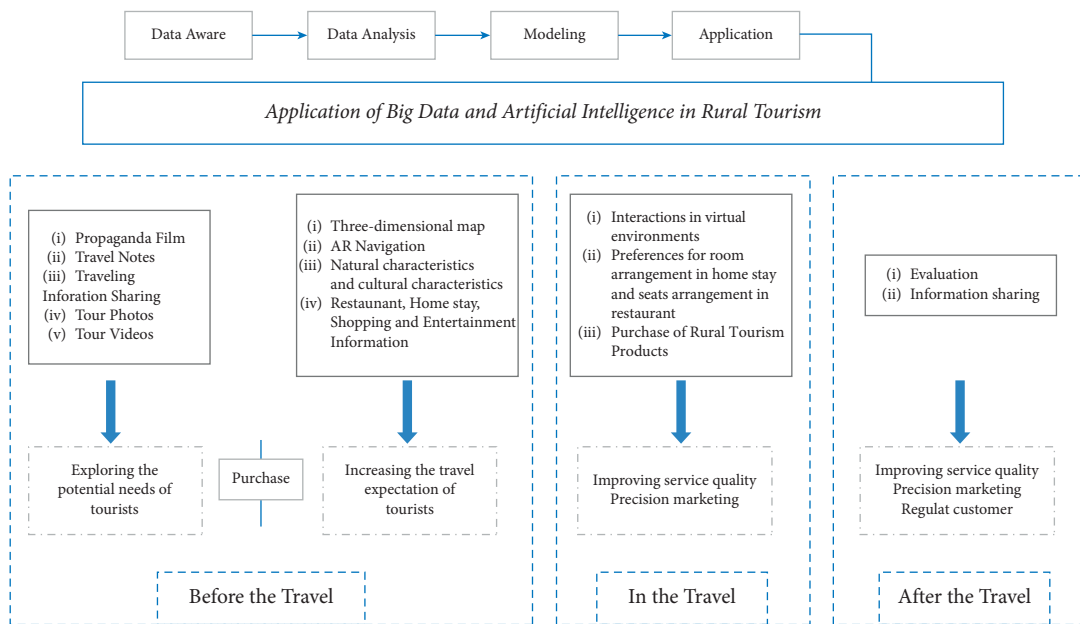FIGURE 2: Transformation of the rural tourism marketing model.

FIGURE 3: The fusion model of artificial intelligence, big data technology, and rural tourism marketing.

to tourists to attract them to go to, and through AR navigation technology, tourists can choose different rural tourism routes according to their actual needs.

4.4.2. In the Travel: Virtual Experience. With the help of artificial intelligence technology, it creates a wonderful virtual interactive tour experience for tourists. Through the data generated by tourists during the tour, such as the tour experience shared by WeChat, TikTok, and others, it makes accurate marketing to tourists [26]. By means of artificial intelligence and AR glasses, visitors can feel as if they are in the scenic spots when learning them from the tour guide. Artificial intelligence can also be used to analyze customer preferences in home stay. So personalized services and marketing can be carried out during the home stay service.

4.4.3. After the Travel: Collect Evaluation. After the tour, visitors are encouraged to fill in questionnaires or share their tour experience and comments on scenic spots, catering, transportation, accommodation, and shopping on the public network platform. Tourism operators can collect and analyze the real information through big data and artificial intelligence technology and constantly improve their services based on the analysis results. At the same time, tourism souvenirs or agricultural products can be promoted to tourists as per the analysis result.

5. Discussion

In the context of the Internet era, new media marketing affects all walks of life, and at the same time, it brings opportunities to rural tourism scenic spots. This paper explores

how the new marketing model can help the development of rural tourist attractions, and it gives the following suggestions:

5.1. Improve the Information Level of Smart Tourism. New media marketing has natural advantages unmatched by traditional media [27]. For example, rapid collection of travel big data, precision marketing, and labor cost saving, are all its advantages. New media can accurately target each target customer. New media has a lot of information about users and can better understand them, which greatly promotes its development [28]. In this way, we can better judge and analyze users' habits and other information. The interactivity of new media can shorten the distance between tourism operators and users. As is known to all, interaction is an important method of communication between the people. In the past, due to the poor continuity of the Internet, it was difficult to publish advertisements or news, and the communication between tourism operators and users was not very convenient. However, with the development of social networks, tourism operators fully interact with users through their own microblogs and websites, which can not only establish a good image of enterprises but also help users solve problems and get feedback in time. New media can enable tourism operators to obtain low-cost marketing power [29]. The cost of new media is generally low. If tourism operators can use it to establish a large low-cost marketing organization and improve their competitiveness, it is undoubtedly very good, which is incomparable to the traditional mode [30]. Scenic spot marketing has gradually abandoned the traditional methods of the past and turned to new media to promote the promotion of scenic spots, which is an inevitable step in the development of science and technology.

The government should increase the application of big data and artificial intelligence technology in the tourism industry, increase capital investment, give preferential policies, drive individual rural tourism operators, and link with meteorological, transportation, catering, accommodation, and other departments to establish an intelligent tourism information platform, and it should improve the quality of tourism service and tourism service experience.

5.2. More Sufficient Integration between Rural Tourism and Artificial Intelligence/Big Data. The development of "smart tourism" requires the construction of hardware equipment, the development and maintenance of software, and the establishment of databases. In order to meet the needs of the vast number of tourists, it is necessary to have abundant and complete service resources and, at the same time, to gain the trust of tourists. In the future, China's rural tourism scenic spots will surely develop into "smart tourism" scenic spots [31].

Every link should be deeply involved and supported by big data and artificial intelligence, from the awakening of intentions before travel to the analysis of behaviors and preferences during travel and the collection of evaluation after travel. Based on big data and artificial intelligence technology, rural tourism marketing can abandon the traditional B2B model and adopt the O2O model, analyze tourists' preferences and needs, dig into the potential will of tourists, implement precision marketing according to the real needs of tourists, and improve customer satisfaction and loyalty.

5.3. Explore Effective Mining Methods of Big Data Technology. At present, the structured or unstructured data related to tourism generally adopt cloud computing technology to collect and store data, but data mining and analysis levels are still need to be improved. Further exploration is needed to find more effective data mining methods to ensure the high efficiency and comprehensiveness of data mining.

6. Conclusions

To realize rural smart tourism and provide tourists with efficient tourism information services, the development of rural tourism under the background of big data and artificial intelligence contains huge opportunities. Big data technology can be integrated and developed in rural tourism, which has played a great role in promoting the development of rural tourism, especially the marketing of rural tourism. Marketing is an important part of the development of rural tourism. Big data is used as a technical tool to formulate a sound marketing strategy to help local rural tourism go out of the countryside, promote rural economic development, help local rural areas get rid of poverty and become rich, and truly solve the "three-rural" problems. This paper comprehensively describes the definition and content of big data and systematically sorts out the definition of domestic rural tourism and the research status of rural tourism marketing at home and abroad. And the relationship between the big data and the development of rural tourism is studied, and it is concluded that big data as a background is a very important opportunity for the development of rural tourism. Combined with the situation of rural tourism resources and rural tourism development, this paper explores the problems existing in rural tourism marketing with big data and artificial intelligence and formulates rural tourism marketing strategies under the background of "Internet +" according to local conditions, which further promotes the development of rural tourism in the region. Due to different research priorities, this research focuses on the rural tourism marketing strategy based on big data and artificial intelligence but does not measure and compare the contribution degree of different algorithms for the rural tourism marketing strategy. In the future, we will conduct more in-depth research on this aspect in order to support rural tourism marketing and rural revitalization strategy accurately.

Data Availability

All the data used are given in the paper.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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