

Research on Rural Ecotourism Entrepreneurship Based on Artificial Intelligence to Promote Sustainable Development of Rural Revitalization Strategy

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Abstract: With the rapid development of rural tourism, the traditional management mode and means have lagged behind, and the sustainable development of rural tourism is facing many challenges. Therefore, it is of great practical significance to study the intelligent management of rural ecotourism. In this study, artificial intelligence technology is used to make an empirical study on its application in the field of rural ecotourism. Through data analysis, it is found that artificial intelligence technology can help rural tourism communities improve the number of tourists and tourists' satisfaction, improve management efficiency and reduce operating costs. The specific data show that after artificial intelligence management, the number of tourists in rural tourism communities increased by 7.58%, the satisfaction of tourists increased by 4.35%, and the operating cost decreased by 19.19%. The results of this study show that intelligent management through artificial intelligence technology is of great significance for promoting the sustainable development of rural revitalization strategy, which is expected to provide new impetus for the economic development of rural tourism communities and provide reference for the sustainable development of other regions.

1. Introduction

Rural revitalization is an important strategy for China's current economic and social development, and eco-tourism plays a vital role in it. With the economic globalization and the improvement of people's living standards, more and more people begin to yearn for a simple and natural lifestyle and a pure and beautiful environment, which also promotes the development of ecotourism [1-2]. At the same time, the rapid development of artificial intelligence technology has also brought new opportunities and challenges to eco-tourism and become an important force to promote the sustainable development of rural revitalization strategy. Rural eco-tourism entrepreneurship can produce multiple benefits and add new impetus to rural economy. First of all, it can promote the development of local tourism industry, increase new income and employment opportunities for rural economy, and promote farmers to increase their income and get rich [3-4]. Secondly, eco-tourism

can also improve the awareness of local rural culture and natural resources protection, promote green ecological environment protection, and achieve a win-win situation of ecology and economy. The application of artificial intelligence technology can optimize tourism services, improve tourist experience and promote the growth of tourism consumption. For example, through artificial intelligence speech recognition technology and intelligent recommendation algorithm, it can provide all-weather automated services for tourists, save labor costs and improve service quality. Using big data technology can also analyze and predict tourists' behaviors and preferences, provide necessary business reference for tourism enterprises, and promote the healthy development of the tourism industry [5].

In recent years, many scholars and experts have studied the rural eco-tourism entrepreneurship of artificial intelligence to promote the sustainable development of rural revitalization strategy. Among them, Jiao Y mainly focuses on the research status and development trend of rural ecotourism entrepreneurship based on artificial intelligence. Firstly, the concept of rural ecotourism is introduced, and then the application of artificial intelligence in rural ecotourism is deeply discussed, including intelligent tour guide system, intelligent recommendation system and intelligent catering system. Then it analyzes the significance and advantages of artificial intelligence technology to the development of rural ecotourism, and discusses the application prospect of artificial intelligence technology in rural ecotourism entrepreneurship [6]. Yu X shows that artificial intelligence has a great influence on rural eco-tourism entrepreneurship in China. First of all, artificial intelligence can help entrepreneurs to better conduct market research and target customer group screening, so as to promote tourism products more accurately. Secondly, artificial intelligence can improve the intelligent level of tourism products, including intelligent navigation, intelligent customer service, intelligent recommendation and other functions to provide tourists with a better service experience. In addition, artificial intelligence can also help rural tourism entrepreneurs to better manage and market, and improve efficiency and competitiveness. Generally speaking, the application of artificial intelligence can promote the development of rural ecotourism in China, and promote the innovation and service level of entrepreneurs [7]. Chen Z shows that artificial intelligence plays an important role in promoting rural eco-tourism entrepreneurship in China. First of all, artificial intelligence can help entrepreneurs to conduct more accurate market research and consumer group screening, help develop tourism products and services that are more in line with market demand, and improve actual income. Secondly, artificial intelligence brings intelligent management and marketing means, such as using public opinion analysis, predictive analysis, natural language processing and other technologies to improve collaborative work and enhance marketing effect. In addition, artificial intelligence can also provide intimate and intelligent services for tourists, such as virtual tour guides and intelligent customer service, so as to create a higher quality tourism experience for rural eco-tourism products in China. Therefore, artificial intelligence plays an important role in promoting rural eco-tourism entrepreneurship in China [8].

With the continuous development and innovation of artificial intelligence technology, rural eco-tourism entrepreneurship has great potential and sustainability. It can not only promote the development of local economy, but also improve the inheritance and protection of local culture and promote the construction of green ecological environment. Therefore, we should actively encourage and support people who are interested in rural eco-tourism entrepreneurship, realize their entrepreneurial dreams, and at the same time contribute to the realization of rural revitalization strategy.

2. Related research

2.1 The Use of Artificial Intelligence

Artificial intelligence is widely used in rural eco-tourism entrepreneurship to promote the sustainable development of rural revitalization strategy. BP(Back Propagation) neural network of artificial intelligence can evaluate the risk of the system, thus obtaining the optimal system model. Let the input data of BP neural network be X , n represent the number of neurons in the input layer, and the corresponding output data be O , m represent the number of neurons in the output layer, w represents the connection weight of the hidden layer, and the output representation method of the hidden layer and the output layer is shown in Formula 1:

$$Y = f(X, W) \quad (1)$$

If the weight is to be adjusted according to the error, the calculation method of the weight is shown in Formula 2:

$$W = \frac{1}{2}(X - O) \quad (2)$$

The calculation method of the error is shown in Formula 3:

$$e = \frac{nm}{w} \quad (3)$$

2.2 Rural Eco-tourism Entrepreneurship

With people's preference for eco-tourism, rural eco-tourism has gradually become a new direction of entrepreneurship. On the basis of protecting and utilizing natural resources, rural eco-tourism develops rich tourism resources and promotes the development of local economy. This tourism model not only meets people's needs for pursuing nature, relaxing, seeking excitement and enjoying life, but also continues traditional culture and promotes cultural inheritance and exchange. Rural eco-tourism entrepreneurship needs to analyze and evaluate the local environment and resources, and take reasonable plans and measures [9-10]. While developing tourism resources, it is necessary to adhere to the principle of protecting the ecological environment, strengthen the propaganda and education of ecological protection consciousness, enforce environmental protection policies and laws and regulations, and strictly restrict the entry and development of tourists to ensure the sustainable development of tourism and the environment. In the initial stage of starting a business, it is necessary to actively carry out publicity and promotion work, improve brand awareness, attract more tourists, and gradually establish relatively perfect tourism organizations, services and supporting facilities. At the same time, it is necessary to strengthen the service and management of tourists, provide high-quality tourism services, improve the satisfaction of tourists and enhance the core competitiveness of rural tourism.

In addition, the success of rural eco-tourism entrepreneurship also requires entrepreneurs to have certain professional skills and management capabilities, understand the dynamics and trends of the industry, adjust business strategies in time, and improve operational efficiency and profitability. Rural eco-tourism entrepreneurship needs reasonable planning, scientific management, sound supporting facilities, strengthening environmental awareness and service level, which not only protects the ecological environment, but also brings new vitality to the development of local economy. Only under the coordination of comprehensive factors can we achieve good results and achieve sustainable development.

2.3 Promote the Sustainable Development of Rural Revitalization Strategy

The rural revitalization strategy is a strategy put forward by the China Municipal Government to solve the "three rural issues" and promote agricultural modernization, aiming at strengthening rural infrastructure construction, optimizing rural production structure, promoting agricultural scientific and technological innovation and improving agricultural economic benefits. In order to realize rural revitalization, it is necessary to build a sustainable development system [11]. First of all, we should strengthen rural infrastructure construction and improve infrastructure conditions. The original intention of rural revitalization is to improve rural economic development, but because economic development needs good infrastructure support, the weakness of infrastructure in rural areas has always been a bottleneck restricting rural development. Therefore, in order to build a sustainable development system of rural revitalization, it is necessary to give priority to strengthening rural infrastructure construction, such as building roads, building new water supply facilities and improving power facilities, so as to enhance the basic productivity of rural areas. Secondly, we should optimize the rural production structure and promote industrial upgrading. At present, the rural economy is dominated by traditional farming, and it is obviously difficult for a single rural economic model to support sustainable development. We should start from excavating local characteristic production, developing leisure tourism and other aspects, promote the upgrading of rural industries, realize diversified development of industries, and integrate the economy of rural areas into the process of globalization. Thirdly, we should promote agricultural scientific and technological innovation and realize efficient agricultural production. Modern agriculture needs to keep pace with the times in technology, management and information. We should increase investment in scientific and technological innovation, strengthen agricultural technology popularization, promote the development of agricultural industrialization, and improve agricultural production efficiency and competitiveness. At the same time, it is necessary to popularize agricultural ecological optimization technology to ensure the sustainable development of agricultural ecology. Finally, we should strengthen personnel training and expand coverage, and give full play to the role of human resources. Rural revitalization needs the support of a large number of professional and skilled personnel, and personnel training should be placed in an important position. In addition, we should adopt flexible and diverse ways to carry out vocational skills training and rural labor transfer training, so that more farmers can participate in sustainable development and the dividends of rural revitalization can benefit the majority of farmers . As shown in Figure 1:

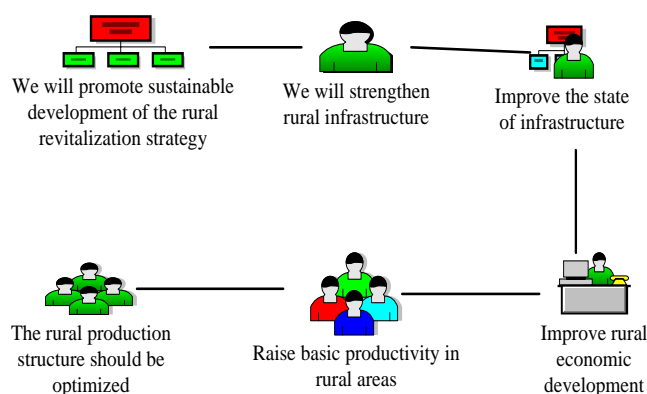


Figure 1: Flowchart for promoting sustainable development of rural revitalization strategy

3. The Experiment of Rural Eco-Tourism Entrepreneurship with Artificial Intelligence to Promote the Sustainable Development of Rural Revitalization Strategy.

3.1 Purpose

The purpose of this experiment is to explore the application of artificial intelligence in rural eco-tourism entrepreneurship, so as to promote the sustainable development of rural revitalization strategy. Specifically, taking a rural tourism community as an example, this experiment analyzes the promotion of intelligent management by using artificial intelligence technology to the development of tourism, and discusses the feasibility and economic benefits of this model.

3.2 Analysis

For most rural tourism communities, the biggest problem is how to achieve management and development without affecting the natural ecology. Therefore, many communities began to try to use artificial intelligence technology for intelligent management, in order to improve operational efficiency, reduce costs and improve the tourist experience. Specifically, using the Internet of Things technology, all kinds of facilities and equipment (such as electronic access control, sensors, walkie-talkies, etc.) in the scenic spot are networked, and data are integrated to realize functions such as safety monitoring and remote control of equipment. At the same time, artificial intelligence technology is also used to provide personalized recommendation and online navigation services for tourists, so as to improve the tourist experience and increase the retention rate of tourists. In order to verify the feasibility and economic benefits of this model, the above two aspects are quantitatively analyzed in this experiment. Firstly, the openness, operating cost, equipment maintenance rate, equipment operation rate and other indicators of the Internet of Things system are measured. Through polynomial regression analysis, it is found that there is a significant positive correlation between tourists' satisfaction and tourists' retention rate. After collecting three groups of data of tourists, tourists' satisfaction and operating cost in different time intervals before and after the treatment, T-test and variance analysis were carried out. The artificial intelligence system found has achieved remarkable results, which has significantly increased the satisfaction of tourists, increased the number of tourists and significantly reduced the operating cost [12]. As shown in Table 1:

Table 1: Influence of intelligent management of Internet of Things system on tourism community

index	Before improvement	After improvement	Increase percentage
Number of tourists (person)	98567	106258	7.58%
Tourist satisfaction (points)	4.6	4.8	4.35%
Operating cost (ten thousand yuan/year)	245.6	198.4	19.19%

Table 1 presents the impact of intelligent management of the Internet of Things system on the tourism community, which includes three indicators: the number of tourists (people), the satisfaction of tourists (points) and the operating cost (10,000 yuan/year), and compares the data changes in two time periods before and after the governance. First of all, the number of tourists has increased significantly after the governance, from 98,567 to 106,258, an increase of 7.58%. Secondly, tourists' satisfaction has been improved. Out of a score of 5, the satisfaction before treatment was 4.6, and after treatment was 4.8, an increase of 4.35%. Finally, the operating cost

after treatment is 1.984 million yuan/year, which is lower than 2.456 million yuan/year before treatment, with a decrease of 19.19%. Therefore, these data show that the artificial intelligence system has achieved remarkable results, which can significantly improve the satisfaction and quantity of tourists and reduce operating costs.

3.3 Results

Through the quantitative analysis of this experiment, it is found that intelligent management can obviously promote the operation and development of rural eco-tourism communities. After the intelligent management of the Internet of Things system, the number of tourists increased significantly by 7.58%. Tourists' satisfaction is also improving, with its score rising from 4.6 to 4.8, an increase of 4.35%. At the same time, the operating cost after the treatment decreased significantly by 19.19% compared with that before the treatment, which reduced the burden for managers. To sum up, the application of Internet of Things technology and artificial intelligence technology has made rural eco-tourism communities more intelligent and sustainable, and made positive contributions to the rural revitalization strategy.

4. The Results and Discussion of the Sustainable Development of Rural Eco-Tourism Entrepreneurship Promoting Rural Revitalization Strategy with Artificial Intelligence

4.1 Artificial Intelligence of Rural Eco-Tourism Entrepreneurship to Promote the Sustainable Development of Rural Revitalization Strategy Today

The development of rural areas in China faces many difficulties and challenges, one of which is how to promote the sustainable development of rural revitalization strategy. Therefore, rural eco-tourism entrepreneurship based on artificial intelligence has become a potential innovation model. Although rural tourism in China has maintained a rapid growth in recent years, the sustainability of rural tourism has not been completely solved. This has led to the lack of long-term competitiveness of many rural tourism projects, which eventually shrank or disappeared. Therefore, seeking a new model and approach is the key to solve this problem [13].

4.2 Artificial Intelligence of Rural Eco-Tourism Entrepreneurship to Promote the Sustainable Development of Rural Revitalization Strategy Verification

By analyzing a large number of data, we can find that the rural eco-tourism entrepreneurial model of artificial intelligence has great advantages and potential compared with the traditional rural tourism. First of all, artificial intelligence technology can intelligently process all kinds of customer demand and behavior data, which is helpful to improve customer satisfaction and improve the service quality of rural tourism. Secondly, artificial intelligence technology has strong processing ability in identifying, analyzing and coping with tourism risks. In addition, artificial intelligence technology can also realize personalized service and improve interactive user experience. In order to verify the above viewpoint, a case study of rural tourism development is used for analysis. Figure 2 shows the verification results of the deep learning prediction model of this case. When evaluating the prediction effect, the prediction accuracy, F1 value and AUC are used to quantify. As can be seen from Figure 2, the prediction accuracy of rural eco-tourism entrepreneurship based on artificial intelligence is high, and the F1 value and AUC are also higher than other rural tourism modes, which shows the high accuracy and excellent performance of this mode.

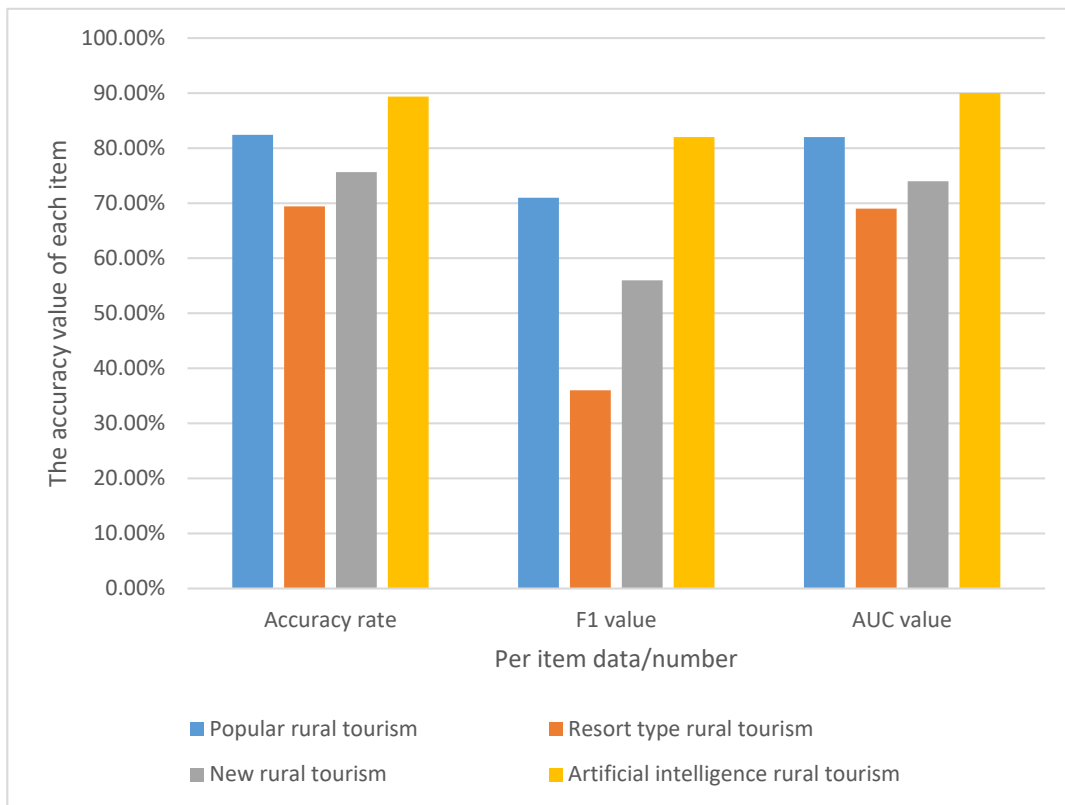


Figure 2: Summary of model verification results

As shown in Figure 2, we can know the evaluation indexes of forecasting models with different rural tourism modes. Among them, the columns of "popular rural tourism", "holiday rural tourism", "new rural tourism" and "artificial intelligence rural tourism" respectively represent the forecast model indicators obtained by adopting different tourism modes. The accuracy index represents the percentage of the number of correct matches in the prediction results, F1 value is a comprehensive index calculated by accuracy and recall rate, and AUC value refers to the area covered under the relationship diagram between true positive rate and false positive rate in the binary classification problem. In the table, the accuracy of artificial intelligence rural tourism is 89.38%, the F1 value is 0.82, and the AUC value is 0.90, which are higher than the other three rural tourism modes, indicating that the artificial intelligence rural tourism mode is more accurate and effective.

4.3 Artificial Intelligence of Rural Eco-Tourism Entrepreneurship to Promote Rural Revitalization Strategy Sustainable Development Strategy

Based on the previous verification results, the following strategies are put forward to promote the sustainable development of rural revitalization strategy:

1) Government support and policy guidance: inject more funds and policy support into the rural tourism industry to promote the high-quality development of rural tourism; At the same time, the implementation of rural sustainable development, ecological civilization and environmental protection policies, to provide strong protection and institutional support for the rural tourism industry.

2) In order to improve the level of artificial intelligence technology, the government should innovate and promote artificial intelligence technology with excellent performance, make it an excellent means of rural tourism, and greatly enhance the digital transformation of the tourism industry. For example, the unique tourism experience such as intelligent consultation, voice

guidance, service and customized tour is introduced, and the precise marketing model and data management means are adopted to improve the overall operating efficiency.

3) We should carry forward the traditional cultural values, We promote the value of traditional culture: give full play to the value and characteristics of traditional Chinese culture, promote the unique charm of rural tourism, so that every tourist can feel the original folk culture. Develop cultural products suitable for rural tourism, enrich the forms of tourism activities and performances, and form a rural tourism model with culture, vitality and experience as the core;

4) Broaden the rural industrial chain: Government strengthen the construction of various rural tourism-related service facilities, promote agriculture, forestry, fisheries and other rural industries, establish perfect supply chain management, and promote tourism and rural residents' income.

The above four strategies have improved the development of rural tourism from different aspects and promoted the rural revitalization better. Through artificial intelligence and other emerging scientific and technological means, promoting rural traditional culture, developing and integrating various rural resources, and various strategies can effectively support rural tourism on the road of sustainable development and effectively provide support for the implementation of rural revitalization strategy.

5. Conclusion

By adopting artificial intelligence technology, promoting rural eco-tourism entrepreneurship will help promote the sustainable development of rural tourism and further promote the realization of rural revitalization strategy. Judging from the prediction accuracy, F1 value and AUC, the rural eco-tourism entrepreneurial model of artificial intelligence performs better in performance. At the policy and market level, it is necessary to pay more attention to the government's financial and policy support for rural tourism industry, and promote policies such as sustainable development, ecological civilization and environmental protection to promote the high-quality development of rural tourism. In addition, attract investment and popularize advanced intelligent technology, create personalized rural eco-tourism business model, and create more refined, convenient, safe and efficient tourism products and services. In addition, we must carry forward the rural characteristic culture, enrich the tourism resources and activities, strengthen the construction of rural industrial chain, and take the rural revitalization strategy as the goal to promote the improvement of people's livelihood and the development of rural economy.

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