Hindawi
Wireless Communications and Mobile Computing
Volume 2023, Article ID 9851837, 1 page
https://doi.org/10.1155/2023/9851837

Retraction

Retracted: Research on Tourism Route Planning Based on Artificial Intelligence Technology

Wireless Communications and Mobile Computing

Received 28 November 2023; Accepted 28 November 2023; Published 29 November 2023

This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] M. Ding, "Research on Tourism Route Planning Based on Artificial Intelligence Technology," *Wireless Communications and Mobile Computing*, vol. 2021, Article ID 2227798, 7 pages, 2021.

Hindawi
Wireless Communications and Mobile Computing
Volume 2021, Article ID 2227798, 7 pages
https://doi.org/10.1155/2021/2227798

Research Article

Research on Tourism Route Planning Based on Artificial Intelligence Technology

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Received 6 October 2021; Revised 30 October 2021; Accepted 6 November 2021; Published 23 December 2021

Academic Editor: Balakrishnan Nagaraj

Study on designing reasonable travel routes with the least time cost and the highest experience index was conducted. An artificial intelligence-based wireless sensor travel route planning study is proposed. First, the improved TSP route planning model is built at the least time consumption and combines the normal distributed random number (ND) with the genetic algorithm (GA) and proposes the ND-GA algorithm, analyzes the overall structure, node structure, communication mode, and network coverage of the wireless sensor network, and gives a mathematical model of wireless transmission energy consumption. Using the proposed algorithm to solve the travel route and detailed itinerary, with time, the 10-year travel route design model based on multitarget dynamic optimization finally detailed analysis of the model results and sensitivity analysis results showing that the application of AI wireless sensor technology can also make the scenic work more efficient; for example, a face recognition system can improve the speed of ticket checking. Although the application of AI technology is widely used in tourism activities, there are some problems, which require the continuous optimization and innovation of AI wireless sensor technology by relevant practitioners, so that it can better serve tourists.

1. Introduction

With the rapid development of social economy, people's living standard tourism has developed from a few luxury to popular consumption becoming an important content of people's daily life with the deepening of the reform, and opening up tourism has become one of the important industries in China; in the future, tourism will become an important driving force to promote GDP growth, so scientifically planning an optimal tourism route makes tourist cost and tourism experience be of very important significance [1]. Sensing network, Internet, and other technologies can not only provide tourists with accurate scenic spot information and tourist routes but also enrich tourists' travel experience, improve tourists' satisfaction, and improve the service quality and efficiency of tourism management, so as to improve tourists' sense of tourism experience. At the same time, tourism enterprises can also analyze, calculate, and summarize according to big data, constantly tap the market demand of the tourism industry, and improve the satisfaction of tourists. According to the analysis and positioning, so as to find the law of the tourism market, such as different groups of preferences for different tourism cities, tourism activities, and preference for tourism transportation, these are problems to be considered and solved in the development of the tourism industry [2]. In tourism activities, the calculation and summary of big data can accurately grasp the preferences of tourists, so as to meet the various needs of tourists, enhance the experience and satisfaction of tourists, and thus promote the development of the tourism industry [3].

A sensor network represents a new computer network and integrates wireless communication technology, network technology, sensor technology, computer technology, and embedded system and can organically integrate logical information world and objective physical world, inject new data into the logical world, solve data source problem, and also realize human-computer interaction and the "ubiquitous, ubiquitous" computing concept. In a sense, the sensor network organizes the information world, the physical world, and the human society into a large three-dimensional system. Artificial intelligence (AI) is an emerging scientific

technology to study and develop theories, methods, techniques, and application systems to simulate and extend human intelligence. Since the birth of the artificial intelligence concept, it has experienced several generations of changes, and its own connotation is constantly rich. Nowadays, artificial intelligence has been integrated with the Internet of things, big data, mobile terminals, Internet+, and other concepts and constantly combined with the development of the times and national policies, so that it has entered a new stage of development and development field. At present, the concept of "AI+" is gradually being accepted by the public, and intelligent life has also ushered in a new era of development with the help of artificial intelligence. With the help of artificial intelligence, all fields of society have shown a broad development space, which not only changes the development mode of various fields but also changes the overall framework, development concept, and operation mode of various fields. Among them, artificial intelligence is widely used in the field of education, which has also attracted the attention of universities and many researchers [4].

This paper mainly considers the following three problems. First, considering the condition constraints of tourism enthusiasts and other practical factors for the different requirements of minimum time consumption, for 2015A scenic spots and several 4A scenic spots, an improved TSP model based on the ND-GA algorithm is established for the cost of aircraft, high-speed rail, and self-driving and the overall structure of the wireless sensor network at the least travel cost and gives a mathematical model of wireless transmission energy consumption. At the same time, based on the different stages of travel experience index influence factors classification and constitute tourism experience index, using particle group algorithm based projection tracing method to index allocation weight, establishing the highest tourism experience index optimization model, based on the above two optimization model introduced tourist attitude parameter to establish 10 years travel route plan multi-target planning model, and by solving the model to get 10 years detailed travel plan. Finally, considering the accommodation fee and catering fee in the next 10 years, a combined prediction model is constructed to forecast the above cost and improve the multitarget planning model built above, finally obtaining a ten-year travel route design model based on multitarget dynamic optimization and a detailed travel plan by solving the model [5, 6].

2. Research Technique

2.1. Application of AI Wireless Sensors in Tourism Activities

(1) Grasp the tourism needs of tourists

The sensor network represents a new computer network and integrates wireless communication technology, network technology, sensor technology, computer technology, and embedded system and can organically integrate logical information world and objective physical world, inject new data into the logical world, solve data source problem, and also realize human-computer interaction and the "ubiquitous, ubiquitous" computing concept. In a sense, the sensor network organizes the information world, the physical world, and the human society into a large three-dimensional system. By taking big data as an example, a variety of data in tourism, including tourists' personal preferences and consumption habits, not only do these data have distinct personal characteristics but also it has the characteristics of a dynamic distribution [7]. As an activity that people participate in at their leisure time, tourism does not belong to people's daily activities, because there is a personalized need for tourism; the time, place, way, and purpose where they travel are different; and the data they form in tourism activities are also diverse. Big data of tourism is often not restricted by culture, region, country, language, and number of people, which can bring economic benefits to the society. Many businesses and individuals in the tourism industry want to create benefits by tapping into tourists' demand for tourism, but the data that needs to be collected is very numerous and complex, so it is more difficult to find a certain rule in it. And the application of big data solves this problem very well; businesses and individuals can tap on big data, analysis, and positioning according to previous tourism data. So as to find the law of the tourism market, such as the preferences of different groups for different tourism cities, tourism activities, and preference for tourism transportation, these are all the problems to be considered and solved in the development process of the tourism industry [8, 9]. In tourism activities, big data calculation and summary can accurately grasp the preferences of tourists, to then meet the various needs of tourists and enhance the experience and satisfaction of tourists, thus promoting the development of the tourism industry.

(2) Reduce operating costs and improve the tourist experience

Today, more and more people choose to travel on their breaks; thus, there is a growing demand for tourism information, and the requirements for the service quality of tourist attractions are also getting higher and higher. As the number of visitors increases, the workload of the scenic area staff is also getting bigger and bigger. In order to provide tourists with a better experience environment and services, the scene has to increase the scenic area staff. In the long run, it will greatly increase the cost of operations, leading to the increased difficulty of management. Thus, many scenic spots use artificial intelligence tools to replace artificial labor; not only will this reduce the cost of operations but also it can reduce the work pressure of the staff. For example, a face recognition system is set up at the entrance of the scenic area, visitors can buy tickets online, and ticket inspection is automated, so as to avoid the tedious manual ticket checking and the waste of human resources [10–12].

(3) Self-service is available for visitors

Artificial intelligence technologies such as face recognition, voice recognition, language translation, image consolidation, and tourist information sorting and transmission have

been very widely used in the tourism industry, and the audience is growing wider and wider. Previously, it has mainly provided services to companies or individuals engaged in the tourism industry, and now, a lot of AI technologies can also provide self-service to tourists, such as electronic tour guides. Visitors can open the e-tour guide function free of charge or paid through WeChat scanning code; no matter which scenic spot the tourist goes, e-guides can all locate visitors through satellite positioning, and according to the characteristics of the scenic spots, historical stories are accurately introduced. Artificial intelligence not only provides many convenience to tourists. It can also greatly reduce the possible risks in the travel process and can operate efficiently and continuously [13, 14]. Another example is that if tourists accidentally get lost after entering the scenic spot, they can find the correct tour route through the navigation system, so as to avoid some risks to a certain extent and ensure the safety of tourists in the travel process.

2.2. The Application of AI Wireless Sensors in Tourism Activities

(1) The demand for personnel in some positions is reduced

Although the application of AI in tourism activities brings many benefits, there are also various problems in its practical application. Tourism is a pillar industry for some countries; not only can it bring great economic benefits to these countries but also it offers a lot of jobs. According to statistics, the number in direct and indirect employment in the tourism industry reached more than 76 million. Once artificial intelligence is heavily applied in tourism activities, some basic jobs, such as ticket sales, ticket checking, and other positions, will gradually reduce the demand for personnel [15, 16].

(2) Destruction of the environment

The application of artificial intelligence technology in tourism activities will also have a greater demand for natural resources, because artificial intelligence technology is mainly on the basis of information technology and the development of information technology; then, artificial intelligence technology is widely used in tourism activities; more natural resources need to be invested to guarantee the hardware facilities in AI. It will cause some degree of damage to the environment.

(3) There are safety risks

It is well known that AI applications require computer systems, and too reliance on computer systems can cause problems such as information security. If artificial intelligence is hacked, it could paralyze the system, causing the loss of tourist information and data or malicious use. At the same time, some criminals will also use AI technology to steal tourists' personal information and property; this brings spiritual and material losses to the tourists [17, 18].

2.3. Overall Design of the Wireless Sensor Networks

(1) Fault tolerance: the impact of the failure of partial sensor nodes in the region is on the overall performance of the network. The fault tolerance emphasizes that the network has the ability to keep the network overall communication after some sensor nodes. If used $R_k(t)$ represents a single node K's fault tolerance or reliability, the mathematical model of the indicator meets the Poisson distribution, and the fault tolerance (1) of a single node K within the time period $(0, t)$ is represented:

$$R_k(t) = e^{-\lambda_k} \frac{{\lambda_k}^k}{k}, \tag{1}$$

where λ_k shows the failure rate of the node K in the time period T.

(2) Scale-type (scalability) index: the number of nodes in the sensor network varies depending on the actual application requirements. If the number of nodes reaches the maximum region tolerance, this not only affects the normal communication between the nodes in the region but also increases the operating cost of the network. This indicator mainly calculates the number of sensor nodes per unit area. The area density knife is shown in

$$\mu(R) = \frac{\left(N \cdot \pi R^2\right)}{A}, \tag{2}$$

where N represents the number of nodes scattered within the region A and R is the effective communication radius of a single sensor node.

2.4. Study on the Optimal Tourist Route. The TSP question is descriptive to finding a distance between all cities given a few cities. In addition, the path that each city is only visited once and the shortest total path distance is guaranteed to first assume 2015A scenic spots as one trip, and then the optimization of the objective function is solved through the corresponding constraints to obtain the optimal multiple travel scheme [19].

2.4.1. Establishment of Excellent Tourist Route Model Constraints

(1) Driving time

as one trip, and then the optimization of the objective function is solved through

For driving time, according to the question, it can be divided into three situations: (a) an 8-hour tour all day with no more than 3 hours of driving; (b) half-day (4 hours) tour driving time of no more than 5 hours; and (c) no tour on the day, no more than 8 hours. The TSP model is now improved

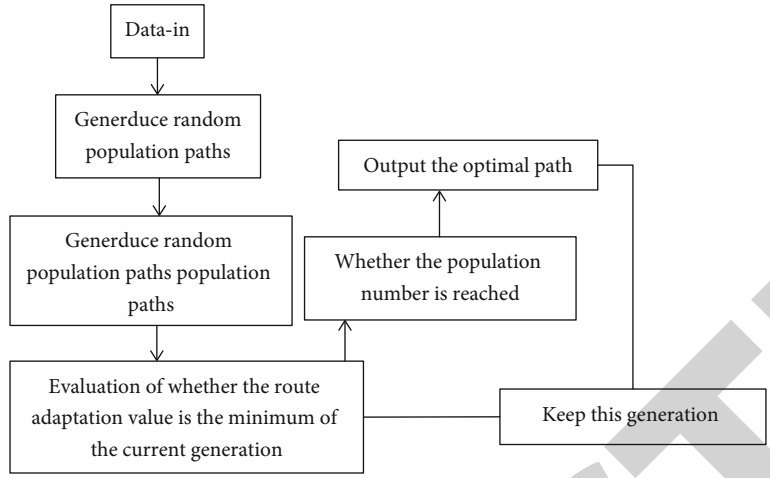

Figure 1: The flow chart of the ND-GA algorithm.

according to the driving time; that is, the enhanced constraints are discussed in four situations:

Situation 1: the minimum tour time of the scenic spot skj is half a day (4 hours)

Situation 2: the minimum tour time of scenic skj is one day (8 hours)

Situation 3: the minimum tour time of scenic spot sjk is a day and half (12 hours)

Situation 4: the minimum tour time for the scenic spot skj is two days (16 hours)

(2) Location relationship of scenic spots and one city

The maximum distance between cities is the distance between Kuggar Old Town scenic spot in Kashgar and Kashgar. It is 1,080 km, and the driving time is about 14 hours.

$$t_1\left(A_{kj1}, S_{kj}\right) = t_1\left(S_{kj}, A_{kj2}\right) \leq 14. \tag{3}$$

(3) City-city location relationship

By calculation, according to the driving time of the two furthest transit cities which is 78 hours, there are

$$t_1\left(A_{ki}, A_{kj1}\right) = t_1\left(A_{kf1}, A_{ki}\right) \leq 78. \tag{4}$$

(4) Visit time

For a specific scenic spot, the longest minimum stay time is two days in half a day (in 4 hours).

$$t_2\left(S_{kj}\right) = 4n_{\text{standard}}n \leq 4. \tag{5}$$

3. Interpretation of Result

3.1. ND-GA Algorithm. To solve the mathematical model of energy consumption for wireless transmission, we introduce a normal distribution random number, improve the traditional genetic algorithm, obtain the ND-GA algorithm, and finally give the algorithm process; as shown in Figure 1, the model is solved.

The improved TSP model was computed based on the ND-GA algorithm to obtain 24 travel routes. Its satisfaction time is the most, and you can visit all 2015A scenic spots. Results are shown. It will take at least 12 years to visit all 5A attractions. We give a detailed analysis on one of these trips, as shown in Table 1.

3.2. The Travel Experience Is the Highest

3.2.1. Determination of the Evaluation Indicators and Their Weights. Assessing the travel experience index is both a difficult and complex inter topic. Thus, in this paper, we follow the feasibility principles and the family chooses scientific and reasonable indicators on the basis of learning and abandonment principle. At the same time, we determine the weights of each metric using the projection tracing method of the particle group algorithm, as shown in Table 2.

3.2.2. The Combination of WPGA Operators Predicts Chess Patterns to Study Changes in Future Travel Costs. Forecast the future transportation expenses, accommodation expenses, tourism and catering expenses, and tourism shopping expenses; first, we utilize three commonly used single items: prediction method gray prediction model, BP neural network prediction model, and support vector machine regression prediction mode. It is then proposed based on the combinatorial predictive model of the weighted geometric power average (WPGA) operator.

Table 1: Details of a single tour.

Feature spot	Circuit	Driving time between scenic spots	Visit time
Ordos Igin Holo Banner Genghis Khan Mausoleum tourist area	Xi'an-Ordos	10.07	One day
Ordos Dalat Banner Xiangshui Shawan scenic spot	Dosdarat banner	9.77	A long time
Shizuishan Pingluo County sand lake tourism scenic spot	Maoshan City-Pingluo Coul	1.20	A long time
Yinchuan town fort west film studios	Town North Fort-Lingwu City	0.93	A long time
Zhongwei Shapotou tourist scenic spot	Lingwu City-Zhongwei City, Shapotou District	1.17	A long time
Tower temple scenic spot in Huangzhong County, Xining City	Xining City-Huangzhong County	2.68	One day
Qinghai Lake scenic area	Huangzhong County-Haibei Tibetan Autonomous Prefecture	4.10	A long time
Jiayuguan cultural relics scenic spot	Gangcha County-Jiayuguan City	5.80	One day
Jiuquan City Dunhuang sand crescent spring scenic area	Jiayuguan City-Dunhuang City	3.42	A long time
Xi'an	Dunhuang City-Xi'an	1.07	

Table 2: Quality evaluation of tourism experience and weight allocation of index Hugh factors.

To evaluate the total target layer	Evaluation of the project layer	Weight	Evaluation factor layer	Weight	Total ranking
Tourism experience quality evaluation	Total ranking	0.23	Convenient degree (C11)	0.44	0.0217
			Punctuality (C12)	0.36	0.0644
	Travel and catering (B2)	0.15	Punctuality (C12)	0.2	0.1399
			Feature (C21)	0.38	0.1210
			Tariff (C22)	0.30	0.146
			Handy (C23)	0.32	0.1002
	Travel accommodation (B3)	0.14	Tariff (C31)	0.27	0.0055
			Handy (C32)	0.32	0.1297
			Comfort (C33)	0.45	0.1427
	Tourist attraction (B4)	0.30	Image of the scenic spot (C41)	0.32	0.1037
			Management and service (C42)	0.38	0.1158
	Travel shopping (B5)	0.18	Local specialty characteristics (C51)	0.43	0.0599
			Tariff (C52)	0.35	0.1001
			Handy (C53)	0.22	0.026

Definition 1. If the WPGA is available, $R^n \longrightarrow n$. For the n element function, satisfy the following form:

$$\mathrm{WPGA}(a_1, a_2, \cdots, a_n) = \prod_{i=1}^{n} \frac{w_1(1 + T(a_1))}{a_1 w_1(1 + T(a_1))}. \quad (6)$$

Among them, $w = (\omega_1, \omega_2, \cdots, \omega_n)T$ is the weighted vector related to the WPGA satisfied:

$$w_i = 1, i = 1, 2, \cdots n, T(a_1) = \sum_{j=1}^{n} \omega_j \sup\left(a_1, a_j\right). \quad (7)$$

Then, the function WPGA dimension weighted power geometric average operator, simply the WPGA operator.

The combined forecast model allows the transportation fee, accommodation fee, travel catering fee, and the weight forecast prediction results of the three square monomial prediction methods [20]. The combination trend of

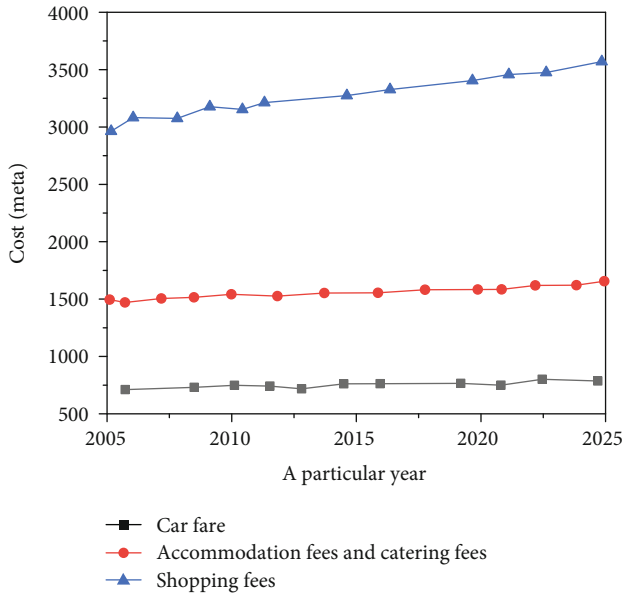

Figure 2: Change trends of transportation expenses, accommodation expenses, tourism catering expenses, and tourism shopping expenses.

transportation, accommodation, tourism catering, and travel shopping fees is shown in Figure 2.

4. Conclusions

With the rapid development of the tourism industry, more and more tourists have higher requirements for the quality and service of tourism activities, so the application of artificial intelligence technology provides a new development opportunity for the tourism industry. The application of AI wireless sensor technology can not only improve the work efficiency of employees but also bring convenience to tourists and enhance the experience and satisfaction of tourists. For example, according to the tourists' search records, the relevant information can be pushed to the tourists to help the tourists make better decisions. At the same time, the application of AI wireless sensor technology can also make the work of scenic spots more efficient; for example, a face recognition system can improve the speed of ticket checking. Although AI wireless sensor technology is widely used in tourism activities, there are some problems, which require the continuous optimization and innovation of AI wireless sensor technology by relevant practitioners to better serve tourists.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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