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Retraction

Retracted: Construction of Integrated Platform for Eco-Sustainable Tourism and Marketing in Southeast Asia Based on Machine Learning

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets 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 own 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] Y. Chen, Y. Li, and T. Tseng, "Construction of Integrated Platform for Eco-Sustainable Tourism and Marketing in Southeast Asia Based on Machine Learning," *International Transactions on Electrical Energy Systems*, vol. 2022, Article ID 6442618, 12 pages, 2022.

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Research Article

Construction of Integrated Platform for Eco-Sustainable Tourism and Marketing in Southeast Asia Based on Machine Learning

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Southeast Asia is one of the most popular tourist destinations in the world, and its tourism model is mainly based on ecological and sustainable tourism characteristics. It is a special practical exploration of this region. However, with the rapid development of the tourism industry, the structural contradictions in the tourism industry have become increasingly prominent, coupled with the weak link of tourism development, making the development of tourism unbalanced. Therefore, this study proposed a platform-related algorithm based on machine learning to build the integration of eco-sustainable tourism and marketing in Southeast Asia and used a collaborative filtering algorithm and a route generation algorithm to recommend information or predict specific needs for specific tourists. The experimental results of this study showed that the difference between different loss functions of the improved transfer algorithm based on machine learning is not significant, which indicated that the method proposed in this study is robust to the choice of a loss function. Compared with the hinge loss function and the logarithmic loss function, the exponential loss function has the highest average classification accuracy of 0.91, of which the average accuracy of the logarithmic loss function is 0.85, and the average classification accuracy of the hinge loss function is 0.79. Therefore, applying the migration algorithm to the architecture of the platform is conducive to the stability of the dataset and to the better display of pages for tourists.

1. Introduction

At present, ecotourism has become an increasingly popular new tourism situation in the world. It mainly advocates the protection of the ecological environment, establishes a sustainable development system, and further helps to protect and enhance the ecosystem through the income generated by eco-sustainable tourism activities. Southeast Asia is one of the regions with the fastest growth in tourism since the 1980s. The prosperity of tourism in Southeast Asia is due to its resource advantages, government policies, and the stability of the customer market. The huge differences in tourism development among countries in the region and the destruction of the ecological environment caused by the over-exploitation of tourism resources are also not conducive to the sustainable development of tourism. Second is the imperfect tourism system and the lack of inter-regional cooperation. The emergence of ecosustainable tourism helps to adjust the current contradiction between tourism and the environment in Southeast Asia and the construction of an integrated information platform in line with the trend of the times is conducive to the long-term development of tourism. Therefore, it is of great significance to promote the transformation of the tourism model and to build and promote the construction of an integrated platform for tourism and marketing within a certain period of time. The integrated tourism marketing platform helps tourist attractions to open up all channels, integrate all touchpoints, unify all scenarios, and analyze all data through automated and intelligent marketing, empowering tourism enterprises to achieve external traffic aggregation and internal traffic transformation.

In the context of the information age, the development of the tourism industry is inseparable from the support of science and technology. The construction of an integrated platform for tourism and marketing is based on the development of new information technology in the new era. Through mobile Internet technology, and with the help of mobile terminal equipment, various required information can be obtained in real-time without being affected by time and space. However, the current Southeast Asian tourism information service system is not perfect, and there are still many problems. In particular, the technology of platform construction needs to be improved, and traditional algorithms cannot meet the development of new functions such as integration. The innovation of this study is that it not only proposes the basic design principle of ASP.NET MVC architecture. It also includes related technologies such as AJAX and Bootstrap, as well as the construction of an integrated platform for tourism and marketing based on machine learning using collaborative filtering algorithms and route generation algorithms. It makes full use of tourism resources to promote the development of ecosustainable tourism in Southeast Asia.

2. Related Work

Southeast Asia is one of the most popular tourist destinations in the world. The current destruction of the ecological environment makes Southeast Asia pay more and more attention to the establishment of an integrated platform for eco-sustainable tourism and marketing. Shasha et al. pointed out that with the increasing global attention to over-tourism and the improvement of environmental awareness, ecotourism has been widely promoted around the world [1]. Adam et al.'s research found that tourists' motivation, satisfaction, postconsumption behavior, and sustainable management of attractions in the context of ecotourism have a profound impact on sustainable practices in the ecotourism environment [2]. According to Ahmad et al.'s research and analysis, tourism is a double-edged sword for economic development. The government can effectively reduce the carbon emissions of tourism through environmental protection policies and policies to achieve sustainable development of the region [3]. Wei indicated that due to the great harm of tourism to the environment, sustainable development of tourism needs to introduce durable and effective management [4]. Fortes's analysis claimed that the social and environmental "crisis" facing coastal ecosystems in Southeast Asia is forcing governments to raise awareness of the need for ecosustainable tourism, adaptive management, and monitoring [5]. The above shows that eco-sustainable tourism is a green variant of tourism. As a developmental strategy, it can help to adjust the current contradiction between tourism and the environment in Southeast Asia and can help realize the harmonious coexistence of the environment and tourism.

Building an integrated platform for eco-sustainable tourism and marketing has become particularly important. According to Wu et al.'s research, it was found that explanatory structural modeling can be used to develop a hierarchical framework for sustainable tourism, aiming to guide tourism towards sustainable development [6]. Shi pointed out that the online dataset and spatial data infrastructure designed based on the EUWATHER project provide new opportunities for ecotourism and outdoor recreation [7]. Ashok et al.'s research survey claimed that ESM models of ecotourism sustainability using qualitative and quantitative techniques provide a recipe for ecotourism to achieve sustainability goals at the operational level [8]. Qiongying indicated that in the future, tourism theories such as the space competition theory, the RMP analysis theory, and the cultural ecology theory should be closely integrated with eco-sustainable tourism [9]. Lalicic and Dickinger pointed out that Web 2.0 no-code interface and mobile computing platform can reshape marketing practice and tourism behavior in the tourism field, tourists can create content creatively and share it with their peers [10]. The application of machine learning in the abovementioned research is basically based on the research of the framework theory part. This study combines algorithm experiments and uses algorithm data to apply it to the construction of an integrated platform for eco-sustainable tourism and marketing. This allows machine learning-like algorithms to be combined with real-world applications.

3. The Platform Construction Algorithm Based on Machine Learning

3.1. Construction of an Integrated Platform for Tourism and Marketing Based on the Concept of Ecological Sustainability

3.1.1. Integrated Platform for Tourism and Marketing. In order to realize the harmonious coexistence of the environment and tourism, the platform should be based on the Southeast Asian tourism cloud database. A cloud database refers to a database that is optimized or deployed in a virtual computing environment, which can achieve advantages such as pay-as-you-go, on-demand expansion, high availability, and storage consolidation. It can fully consider the requirements of protecting the ecological environment, and based on the theory of ecotourism, it can provide tourists with a platform that can provide the most local characteristics of catering, entertainment, and shopping information. This is convenient for tourists to travel and search for guide information, improve tourists' play experience, and enhance tourists' stickiness [11, 12]. Whether it is sustainable development, market demand, management mechanism construction, regional coordinated development, or other concerns, it is more systematic in function and more in-depth in research, and proposes targeted and realistic improvements to the problems that arise.

The characteristics of the integrated platform lie in the timeliness of information acquisition from various information acquisition channels such as the bidirectionality of information, the interaction of communication, personalized services, and network transactions. The specific advantage is that tourists can obtain information, browse information, and publish information on the platform for the first time through the Internet. It can also interact with platform customer service personnel and project operators. Its main advantage is the sense of intelligence, and tourists can complete the payment transaction of tourism products online. For tourists, it not only improves the play experience but also meets their diverse and personalized needs, making tourism resources give full play to their due value [13, 14]. For tourism enterprises, mobile terminal equipment can be used as an important tool for tourism marketing. A mobile terminal is a mobile communication terminal, which refers to a computer device that can be used on the move, and its mobility is mainly reflected in the mobile communication capability and portability. The combination of simple and fast marketing methods can capture potential tourism consumers. It provides differentiated services according to the different needs of consumers and stimulates their demand for tourism, thereby solving the problem that traditional tourism can only sustain if it actively generates demand.

3.1.2. Analysis of the Functional Requirements of the Integrated Platform for Tourism and Marketing. In terms of function, it supports offline tourism services in Southeast Asia and satisfies tourists' inquiries and map browsing of basic information such as tourist attractions information, hotel information, catering information, and shopping information through text and pictures. The establishment of the use case model is the result of comprehensive discussions between developers and users, which indicates that developers and users have reached a consensus on the requirements. In the functional requirements analysis phase, the use case model can be used to obtain user requirements and their corresponding functional requirements [15]. The main participants of this model are tourists, and the use case for tourist service needs is shown in Figure 1.

This study analyzes the whole process of tourism as shown in Figure 1. Scenic spot tour: it provides users with information about the scenic spot in text form, provides ticket price, opening time, contact information, scenic spot address, and traffic information, and can automatically dial out the phone and provide a voice explanation function. Classified information recommendation list: it provides classified recommendation functions for information points, including play, catering, accommodation, transportation, shopping, and entertainment. Tourists can select their favorite attractions, hotels, and other information from different classified information according to the list of information points recommended by the application. People can determine travel plans by viewing their corresponding detailed information, and can also record, edit, and delete travel information by adding travel functions. Map guide: visitors can collect data, 3D modeling and guide map of iconic scenic spots in the scenic area. The map layer can be zoomed in or out, and the iconic scenic spots have information displayed. Tourists can click to view the details. The use case model is mainly aimed at the application functions

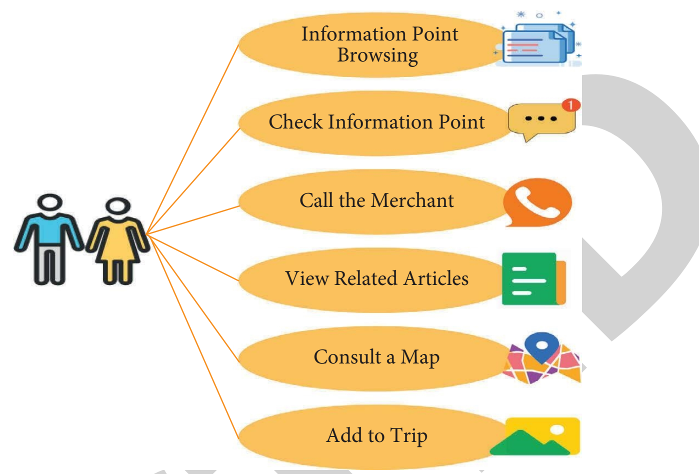


Figure 1: Pretour service demand use case.

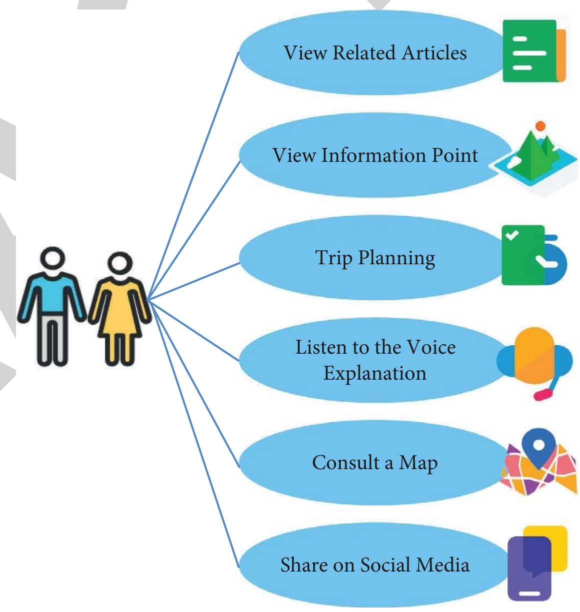


Figure 2: Service demand use case during and after travel.

that the user understands. Travel experience sharing: After the tour, tourists can post their travel itinerary and travel experience to social platforms for reference by relatives and friends. The service demand use case during and after travel is shown in Figure 2.

3.2. Platform Architecture and Related Design

3.2.1. ASP.NET MVC Architecture Design Pattern. The data layer uses the EF framework, and the MS SQL database can be used when there are fewer users in the early stage of operation. It is a database platform that provides a complete solution from the server to the terminal of the database. The database server part is a database management system for establishing, using, and maintaining the database. The Argi.Core layer is the core layer of the entire platform system, also known as the infrastructure layer, which mainly completes the implementation, configuration, and model of the cache. The Argi.Service layer and the web framework layer are called the service layer. The former is the service layer of the entire platform system, providing the realization of each field. The latter is the domain service of the web, providing a large number of service facilities of the web. The service decoupling of these two parts is very flexible when the function upgrade of the cloud service platform is switched to other service modes in the later stage [16]. The ASP.NET MVC architectural design pattern can realize the separation between presentation UI and presentation logic so that modules can have high cohesion and low coupling. UI refers to the overall design of the software's human-computer interaction, operation logic, and beautiful interface. A good UI design is not only to make the software have personality and taste but also to make the operation of the software comfortable simple and free and to fully reflect the positioning and characteristics of the software. The system architecture is clearly layered, the functional design is modular, and the level division of the platform architecture is shown in Figure 3.

The ASP.NET MVC multitier architecture design pattern clearly separates the various functions of the system. The platform is divided into a data layer, an infrastructure layer, a business domain service layer, a web domain service layer, and an application layer [17, 18]. The idea based on a high cohesion and low coupling is now represented by a more classic three-tier architecture, but the three-tier architecture is a kind of no specific design and stays in the framework stage. However, MVC focuses on the decoupling of the presentation layer in the corresponding three layers. In the classic MVC pattern, M refers to the business model, V refers to the user interface, and C refers to the controller. The purpose of using MVC is to separate the implementation codes of M and V, so that the same program can use different forms of expression. This mode specifically describes the design method of the system, as shown in Figure 4.

MVC means model, view, and controller. The model and the entity layer model in the three-tier architecture have different meanings, and the two are not in a one-to-one correspondence. As can be seen from Figure 4, MVC divides the UI in the three-tier architecture into a control layer and a view layer and integrates the data access layer and business logic layer in the three-tier architecture into a model layer. Second, the development and maintenance of the platform need to consider the cost and benefit ratio, and with the development of cloud computing, this problem has been well resolved. The huge data computing processing program is decomposed into countless small programs through the network "cloud," and then the small programs are processed and analyzed through a system composed of multiple servers, and the results are returned to the user. Development and operation teams can easily build and deploy applications on the cloud platform without maintaining servers by themselves. The performance, storage space, and bandwidth of the cloud server are paid elastically based on user usage. This can save a lot of development and maintenance costs and time, allowing the DevOps team to focus

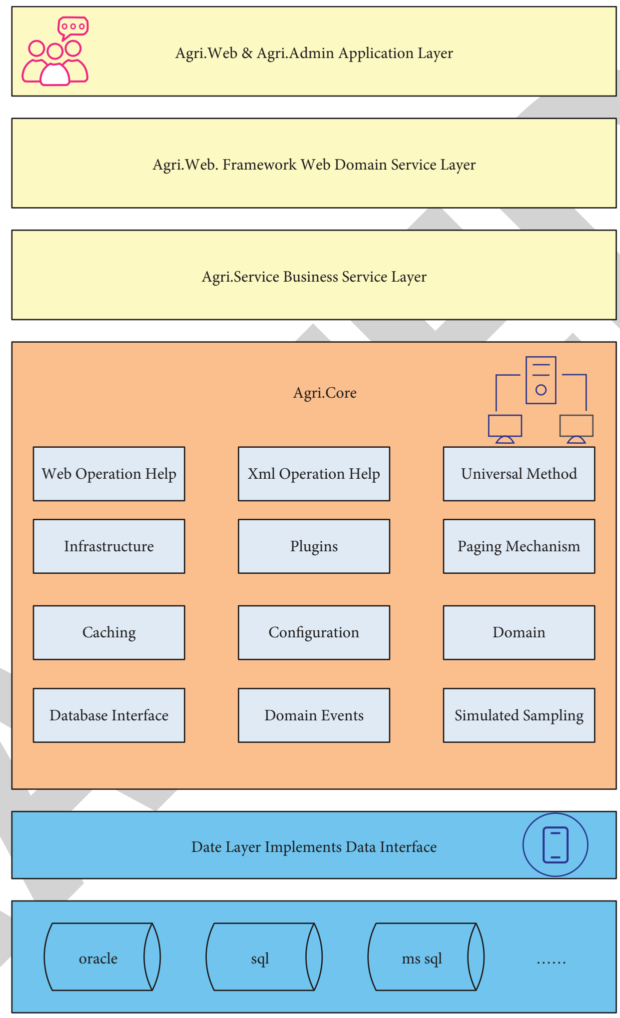


FIGURE 3: Information platform architecture hierarchy diagram.

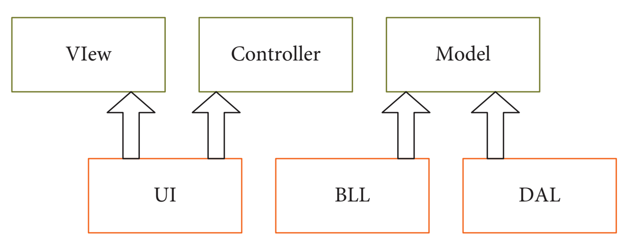


FIGURE 4: Differences and connections between a three-tier architecture and an MVC design pattern.

on their core business [19]. At the same time, in order to improve the access speed of the information platform, CDN technology can be assisted to improve the response speed of users' access to the information platform at the minimum cost, save investment, and achieve the effect of improving user experience. The role of CDN is to use streaming media server clustering technology to overcome the shortcomings of insufficient output bandwidth and concurrency capabilities of single-machine systems, which can greatly increase the number of concurrent streams supported by the system and reduce or avoid the adverse effects of single-point failures.

3.2.2. AJAX and Bootstrap Technology. Bootstrap is a front-end framework developed based on HTML5 and CSS3, which can be used for the development of web applications and websites. The reason why it can adapt to smart terminal devices such as desktop computers, tablet computers, and mobile phones is that it is compatible with the Jquery plug-in, which brings users a better interactive experience [20]. The abovementioned paragraph mainly introduces the concept and characteristics of the construction of an integrated platform for eco-sustainable tourism and marketing, as well as related theories and technologies used in the development of the platform. This includes ASP.NET multilayer architecture pattern, AJAX, and Bootstrap technology as shown in Figure 5.

It can be seen from Figure 5 that the construction of the platform requires the system to have good business logic, data unity, and consistency of interface style. The development method is based on the mainstream browser/server (B/S) mode and uses C# language and ASP.NET MVC framework to write and implement the logic function of the website. The client is unified, and the core part of the system function realization is concentrated on the server, which simplifies the development, maintenance, and use of the system, and only one browser needs to be installed on the client's computer. The front-end of the website uses the JQuery framework, Bootstrap responsive design, Html5, Css3, and other technologies to achieve a good front-end design effect [21]. Website architecture and coding take into account SEO onsite optimization, and user permissions are designed with an improved RBAC model. Visual Studio is used as the development tool, and SQLServer R2 is used as the database. These software development technologies are mature and can meet the needs of the information platform.

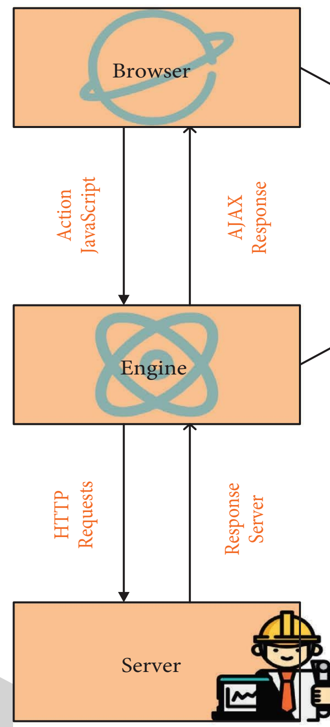


FIGURE 5: AJAX working principle diagram.

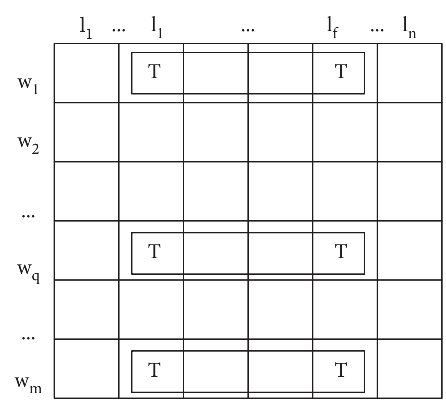


FIGURE 6: A schematic diagram of the collaborative filtering algorithm.

3.3. Recommendation of Related Algorithms Based on Machine Learning

3.3.1. The Collaborative Filtering Algorithm Based on Users and Information. Collaborative filtering algorithms are widely used in industries, such as e-commerce, social networks, and other platforms [22]. As a very mature system, it has developed very successfully. The principle formula of this algorithm is briefly described below [23]. The purpose of the collaborative filtering algorithm is to recommend information or predict specific needs for a specific user based on the user's prior preferences or the opinions of other similar users. The collaborative filtering algorithm uses the preferences of a group with similar interests and common experiences to recommend information that users are interested in. Individuals respond to the information to a considerable extent through the cooperation mechanism and record it to achieve the purpose of filtering and help others to filter the information. The response is not necessarily limited to those of particular interest, but the record of information of particular interest is also quite important. In a typical collaborative filtering algorithm, the set of users is set as

$$W = \{w_1, w_2, \ldots, w_m\}. \tag{1}$$

The recommended information data set is

$$L = \{l_1, l_2, \ldots, l_n\}. \tag{2}$$

Each user has a corresponding dataset L_{w_q} $(1 \le q \le m)$ to represent the information that the user wants to obtain. The relationship between these users and information can be expressed as the display of information to the user, which can usually be obtained through analysis from the user's search records, user logs, and other data. As shown in Figure 6, it is a typical schematic diagram of collaborative filtering.

Based on the cosine similarity, we derive the following formula:

$$\operatorname{sim}(l, f) = \frac{l \cdot f}{\|l\|^2 * \|f\|^2}. \tag{3}$$

In this case, we consider the two sets l and f as two n-dimensional vectors, and then, we calculate the cosine similarity of the vectors as the similarity of the datasets, based on the Pearson correlation.

$$\operatorname{sim}(l, f) = \frac{\sum_{w\in W}\left(T_{w_1 l} - \overline{T_l}\right)\left(T_{w_1 f} - \overline{T_f}\right)}{\sqrt{\sum_{w\in W}\left(T_{w_1 l} - \overline{T_l}\right)^2}\sqrt{\sum_{w\in W}\left(T_{w_1 f} - \overline{T_f}\right)^2}}. \tag{4}$$

We assume that the set of users whose data l and f are both displayed as W, where $T_{w,l}$ represents the display of the information l to the user w, and $\overline{T_l}$ represents the multidimensional display of the l -th information.

Based on the improved Pearson correlation, we get

$$\operatorname{sim}(l, f) = \frac{\sum_{w\in W}\left(T_{w_1 l} - \overline{T_w}\right)\left(T_{w_1 f} - \overline{T_w}\right)}{\sqrt{\sum_{w\in W}\left(T_{w_1 l} - \overline{T_w}\right)^2}\sqrt{\sum_{w\in W}\left(T_{w_1 f} - \overline{T_w}\right)^2}}. \tag{5}$$

It can be seen that, whether based on the cosine similarity or Pearson correlation, the two algorithms do not consider the difference in user presentations. The cosine similarity is to evaluate the similarity of two vectors by calculating the cosine of the angle between them. Therefore, in the abovementioned formula, $\overline{T_l}$ is replaced by $\overline{T_w}$, which represents the multidimensional display of the w -th user. Finally, for the recommendation probability of specific information l to the user w, it can be represented by the weighted average of all information similar to l by w.

$$D_{w,l} = \frac{\sum_{q\in M}\left(C_{l,q} * T_{w,q}\right)}{\sum_{q\in M}\left(C_{l,q}\right)}. \tag{6}$$

The set M represents a set of similar information to l, that is, the data that the users w have consulted.

The user-based collaborative filtering algorithm searches for the users closest to the target user and predicts the preferences of the target users according to the obtained user preferences. The first step is based on the user's history file, and the second step is to calculate the user similarity to find the similar users closest to the target user. The most common similarity algorithm is the Pearson correlation coefficient.

$$\operatorname{sim}(a, b) = \frac{\sum_{l\in C_{ab}} {}^{\gamma}a, l^{\gamma}b, l}{\sqrt{\sum_{l\in C_{ab}} {}^{\gamma}a, l^2}\sqrt{\sum_{l\in C_{ab}} {}^{\gamma}b, l^2}}. \tag{7}$$

Among them, $\overline{\gamma_a}$ represents the average exposure of all information items for the user a.

3.3.2. The Route Generation Algorithm. Spatiotemporal big data includes three-dimensional information of the time, space, and thematic attributes, and has the comprehensive characteristics of multisource, massive, and fast updating. Traditional spatiotemporal data research often only focuses on the behavioral characteristics of the users at a certain point in time or at a certain place, while ignoring the trend characteristics of users in geographic locations over time. These often represent the characteristics of the user's spatiotemporal attributes. When processing spatiotemporal data, the data can be jointly analyzed from the perspective of time and space. On the one hand, it can judge the user's historical preferences at a known moment, and on the other hand, it can also predict future behaviors. For the above reasons, spatiotemporal trajectory analysis has become an important part of spatiotemporal data mining.

Space-time trajectory analysis can be divided into two categories. The first category is space-time trajectory clustering. By clustering spatiotemporal data, sparse and dense regions in the user's trajectory space can be identified, and then the preferences among users can be compared or abnormal features can be extracted. The second category is the spatiotemporal trajectory similarity analysis, which judges the similarity between users by comparing the spatial similarity of the trajectories. The spatiotemporal trajectory clustering algorithm uses distance as a unit of measure to judge the similarity of two objects. There are a variety of calculation methods, among which the common algorithms are as follows.

First, for the two trajectories, according to the position information of each time node, the Euclidean distance of the corresponding points on the trajectory at the same time is calculated, and then all distances are summed to obtain the Euclidean distance between the trajectories. Let X and Y represent two trajectories, and the number of time points is n, then the Euclidean distance of the trajectories is

$$\operatorname{Dist}(X, Y) = \sum_{j=1}^{n} \operatorname{dist}\left(x_j, y_j\right). \tag{8}$$

Among them,

$$\operatorname{dist}\left(x_j, y_j\right) = \sqrt{\left(x_{ja} - y_{ja}\right)^2 + \left(x_{jb} - y_{jb}\right)^2}. \tag{9}$$

This distance can be converted into the form of similarity, namely,

$$\operatorname{sim}(X, Y) = 1 - \frac{\operatorname{Dist}(X, Y)}{\min(m, n)}. \tag{10}$$

For the problem of itinerary arrangement during the trip, given a set of scenic spots recommended for the user or after the user has selected the scenic spot he wants to go, a recommended travel route needs to be generated for the user, and at least the following two conditions should be met. From the beginning, the shortest route is guaranteed if we visit all the attractions only once, such a problem has a very classical algorithmic model in mathematics, namely the traveling salesman problem (TSP). This problem describes that given the distances between places, it is important to calculate the shortest route that does not visit each place repeatedly and returns to the starting point. Its mathematical expression is in the following form: given a set of locations $I = \{I_1, I_2, \ldots, I_n\}$, finding a route $I' = \{I_1', I_2', \ldots, I_n'\}$ visited in order, so that the following objective function is minimized.

$$P(Q) = \sum_{j=1}^{n-1} \operatorname{dist}\left(I_j, I_{j+1}\right) + \operatorname{dist}\left(I_n, I_1\right). \tag{11}$$

Among them, $\operatorname{dist}(I_j, I_{j+1})$ represents the distance between location I_j and location I_{j+1}. The traveling salesman reflects the traveler's ability to make travel smart and profound, that is, the level of clever planning, enjoyment, and trouble-shooting of the journey. Although the goal of the traveling salesman problem is to find a closed shortest loop, considering the actual travel arrangement, the origin and destination of the user's travel do not necessarily coincide. However, in terms of time, when the user's itinerary is arranged for multiple days, each day's itinerary starts from the residence, traverses the scenic spots, and then returns to the residence. Therefore, abstracting the travel route generation as the traveling salesman problem still has its practical significance.

3.3.3. The User Stay Point Analysis. Supposing the set of visited places of the user W_i is $\{I_1, I_2, \ldots, I_n\}$, then for the user W_i, the set of all visited places is

$$I_j = \{I_1, I_2, \ldots, I_n\}. \tag{12}$$

I_n is the location to visit, and its expression is a combination of longitude and latitude.

$$I_n = \{\text{long}_n, \text{latt}_n\}. \tag{13}$$

For the check-in trajectory I_j of the user W_i, there are often multiple check-in points in a short period, which can be understood as the user uploaded multiple photos when visiting a certain scenic spot. Although these check-in records reflect the user's check-in situation, from a spatial point of view, however, the user does not move much in a short period. A large number of repeated check-in data would cause too much data to be clustered and this would affect the efficiency of the algorithm.

Based on the abovementioned considerations, the preprocessing work before clustering is first performed on the scale of a smaller distance. That is to say, all the check-in records of the user in a short period and a short distance are regarded as a stop point. The formulas for calculating the stop point Q for x check-in points are as follows:

$$\begin{aligned} \text{long}_Q &= \frac{1}{x}\sum_{j=1}^{x} \text{long}_j, \\ \text{latt}_Q &= \frac{1}{x}\sum_{j=1}^{x} \text{latt}_j. \end{aligned} \tag{14}$$

The above formulas indicated that the stay point Q is the center point of all check-in points that meet certain conditions, thereby initially reducing the number of check-in points in the user trajectory. Next, it is necessary to perform cluster analysis on these check-in points, so as to aggregate the check-in points in the same area into a regional cluster and find the attractions they visit from these clusters. The goal of cluster analysis is to collect data to classify it on the basis of similarity, measure the similarity between different data sources, and classify data sources into different clusters. The mean-shift algorithm is a kind of clustering algorithm, which is robust and does not need to preset the number or area of clusters. It is more suitable for the aggregation of low-latitude vectors. The process of the mean-shift clustering algorithm is an iterative process based on the gradient estimation of the nonparametric kernel density. That is, according to the mean-shift offset vector, the calculation result is moved in the direction of its vector to let the point move again and again until certain conditions are met.

Given at any E^d coordinate points $y_x\,(x = 1, 2, 3, \ldots, n)$ in the d dimension space, for any point y, its mean-shift offset vector is calculated as

$$M_k(y) = \frac{1}{p}\sum_{y_x \in Q_h} (y_x - y). \tag{15}$$

S_k is the high-dimensional sphere area with a radius k, and S_k is defined as

$$S_k(y) = \left\{x \,\middle|\, (x-y)(x-y)^T \leq k^2\right\}. \tag{16}$$

The iterative process of the entire algorithm is to move the calculated offset vector to move the distance from the center of the sphere y to the direction of the offset vector.

$$y := y + M_h(y). \tag{17}$$

Finally, the position of the center of the circle is always kept in force balance, that is, the position where the offset is zero.

Considering that the contribution of each coordinate point to y in the ball area is different, a kernel function is introduced for the abovementioned formula, namely,

$$M_k(y) = \frac{\sum_{j=1}^{n} G_K\left(y_j - y\right)h\left(y_j\right)\left(y_j - y\right)}{\sum_{j=1}^{n} G_K\left(y_j - y\right)\big)h\left(y_j\right)}, \tag{18}$$

where $G(x)$ is the unit kernel function, K is a positive definite diagonal matrix, and $h(y_j) \geq 0$ is the weight of each sample, so the offset vector can be rewritten as

$$M_k(y) = \frac{\sum_{j=1}^{n} G\left(y_j - k/k_j\right)h\left(y_j\right)\left(y_j - y\right)}{\sum_{j=1}^{n}\sum_{j=1}^{n} G\left(y_j - k/k_j\right)h\left(y_j\right)}. \tag{19}$$

In short, the mean-shift clustering algorithm selects the point with the largest number of visits as its classification according to the number of visits to each point by different classes and counts the data points contained in each cluster.

3.3.4. Time Window. The Hausdorff distance is a unit of measure used to describe the distance between two sets of points in space. It reflects the similarity between two point sets. For the check-in trajectory between users, it only considers the influence of spatial distance but does not analyze the time. Spatial distance refers to the distance between points, lines, and surfaces in three-dimensional space in solid geometry. It is the most basic idea to

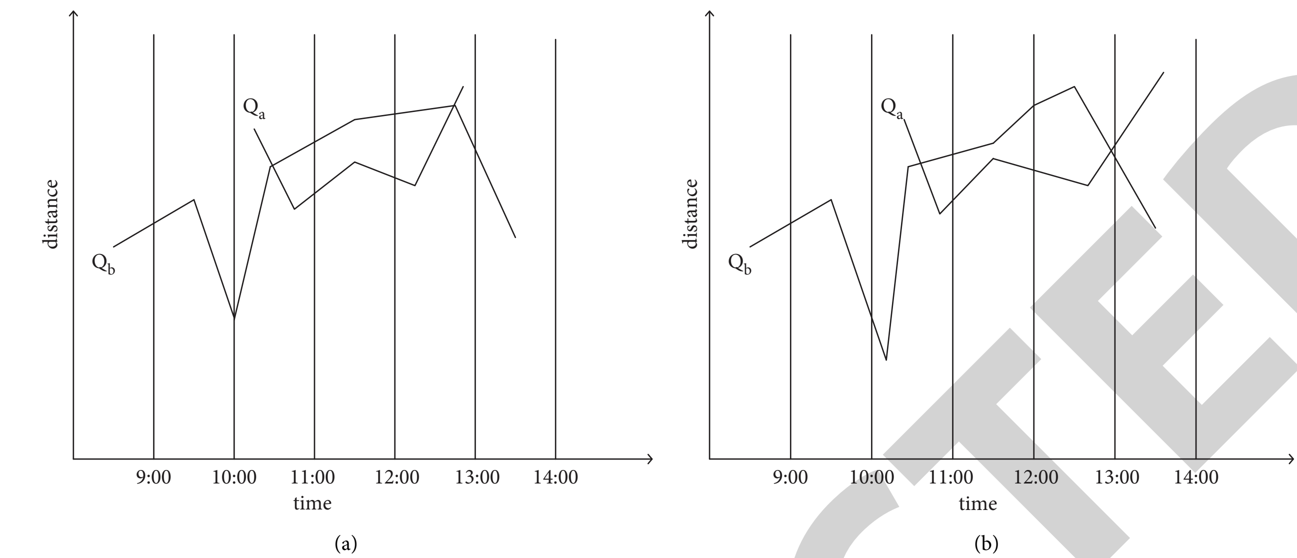


Figure 7: Comparison of two-time windows: (a) user trajectory time window and (b) sliding time window.

Table 1: Values and levels of each dimension of the system under different weights.

Dimension	Society			Economy		
	D1	D2	D3	D1	D2	D3
Dimension weight	11.92	7.86	6.91	9.78	7.21	6.14
Dimension value	4.55	3.72	2.41	3.31	3.78	2.91
Evaluation level	33.98%	45.65%	93.27%	34.17%	42.11%	87.22%

concentrate the known and desired quantities on the same plane. Therefore, after the concept of the time window is introduced, the obtained data are the check-in data uploaded by the user. Therefore, in a track, the timestamp and the time interval of each point are not constant, and the number of check-in points between tracks is also not the same. If the entire point set is only analyzed based on the Hausdorff distance, it does not consider the similar situations between users in the same area over a period of time, as shown in Figure 7.

It can be seen in Figure 7(a) that Q_a and Q_b are the trajectories of two users, which are displayed in a polyline distribution in the order of time. It can be seen in Figure 7(b) that the similarity comparison of user trajectories is based on the sliding window, the first is to set the size of the sliding window as T and the sliding interval as d. Supposing the time window is [9 : 00~14 : 00] and the length is 5 hours, then for Q_a and Q_b, the trajectory based on the time window T is

$$\begin{aligned} Q_a^T &= \left\{q_{ai}, q_{ai+1}, \cdots q_{ai+m,}\right\}, \\ Q_b^T &= \left\{q_{bi}, q_{bi+1}, \cdots q_{bi+n,}\right\}. \end{aligned} \tag{20}$$

Through the above steps and sorting by size according to the similarity distance between the trajectories, the users with the most similar trajectories to each user can be obtained and based on the places where these users have passed, scenic spots can be recommended for the target users.

4. Experimental Results of the Migration Algorithm

4.1. Three Benchmark Domain Transfer Learning Dataset Experiments. To verify the effectiveness of the algorithm, some experiments would be conducted on three benchmark domain transfer learning datasets to evaluate the performance of the proposed method. We first test how the proposed method uses weights D1, D2, and D3 for different terms. The classification performance of the proposed method is then tested by comparing it with different transfer learning methods (in terms of classification accuracy and running time). This experiment uses cross-validation, that is, testing by labeling data points and using them during training.

In addition, this experiment divides the target domain set into ten layers. Each layer is used as a test set, and other layers are combined and used as a training set. For the training set, this experiment randomly selects half of the data points and sets them as labeled data points, leaves the remaining half as unlabeled, and then evaluates their classification performance.

It can be seen from Table 1 that in the evaluation of the system action mechanism, the perceptual evaluation of the test set is rated as sustainable, unsustainable, and potentially sustainable. It plays a key role in linking the structure and function of the system. The link between structure and function in biological systems and manmade systems is function and mechanism, while in social systems, it is called

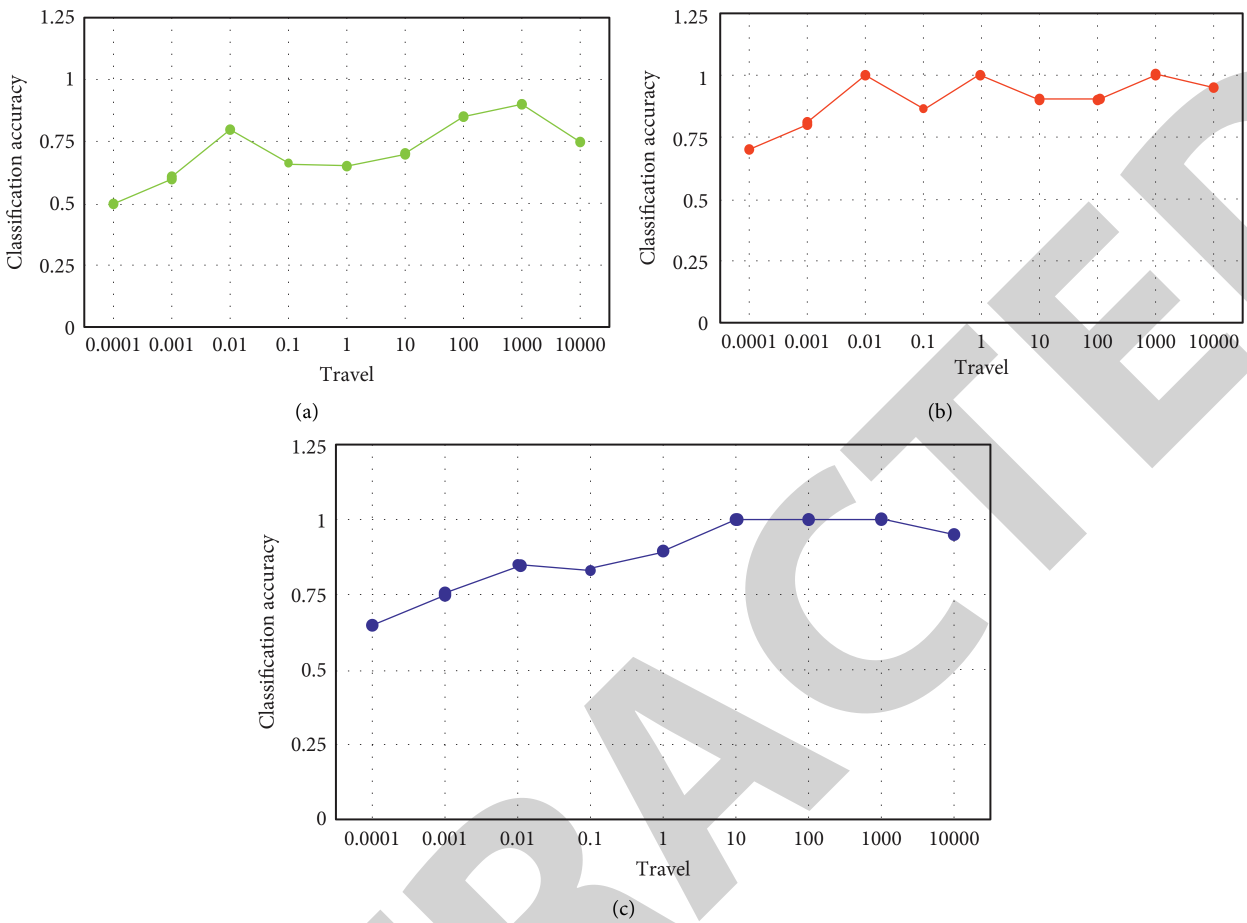


Figure 8: Sensitivity curves for item weights in the travel dataset for three classes of objective functions: (a) D1 dataset sensitivity, (b) D2 dataset sensitivity, and (c) D3 dataset sensitivity.

mechanism. The D3 has the highest perception rating of 93.27%, which is perceived as sustainable. The D2 perception rating is potentially sustainable with a dimension weight of 7.86. The D1 social dimension rating is only 33.98%, which is perceived as unsustainable.

For the multiclass classification problem, the proposed binary classification model would be extended to multiclass classification through a one-to-one strategy. For datasets with more than two domains, this experiment uses each domain as the target domain in turn and randomly selects another domain as the source domain. The accuracy of all target domains is averaged and this is reported as the final result. For example, this experiment uses the dataset of travel destination reviews. For different D1, D2, and D3 values, the algorithm accuracy changes in different trends, as shown in Figure 8.

As shown in Figure 8, it can be seen from Figure 8(a) that the method proposed in this study is stable for the weight D1. The highest accuracy is obtained when D1 is set to 1000. As can be seen in Figure 8(b), the accuracy relatively increases with respect to the change in value, with the accuracy being about 1 on average. However, as can be seen from Figure 8(c), a clear trend is that the accuracy increases as D3 reaches 10, and tends to level off from 10 to 1000.

4.2. Comparison with Other Transfer Learning Methods

4.2.1. Comparison of Classification Accuracy and Running Time Performance. This experiment would compare the performance in terms of classification accuracy and running time. Travel Destination Review Dataset: this dataset is a review dataset of several destinations for travel. It treats each travel destination as a domain and each review as a data point. Travel Information Database Dataset: this dataset is a dataset of text images, including 15 categories of document content, and the categories are organized in a hierarchical structure. A class generally has two or more subclasses. For example, in the summer travel hotspot destination category, there are two subcategories, namely the surfing category and the ocean vacation category. Based on the segmentation principle of source and target domains, there are 8 classes in this dataset, and for each class, one subclass is located in the source domain and the other subclass is located in the target domain. A User-Shared Comment Dataset: this dataset is a dataset of comments on travel itineraries and destinations, including two types of comments, namely graphic images and text content. Reviews fall into two categories, positive and negative. In this experiment, user comments are used as the source domain, while graphic images and text content are used as the target domain, and the word bag feature for

Table 2: Comparison of the classification accuracy of different algorithms for datasets.

Method	Travel destination	Tourist information	Share and comment
Recommend	0.882	0.624	0.789
Dataset series 1	0.644	0.527	0.657
Dataset series 2	0.725	0.577	0.693
Dataset series 3	0.713	0.519	0.671

Table 3: Comparison of running time of different algorithms on datasets.

Method	Travel destination	Tourist information	Share and comment
Recommend	15.52	78.63	20.39
Dataset series 1	26.52	91.27	23.57
Dataset series 2	17.31	85.39	31.38
Dataset series 3	19.65	81.31	24.98

each domain is used as the comment feature. Feature selection-based methods can simplify models, make them easier to understand by researchers or users, improve generality, and reduce overfitting.

From the aspect of classification accuracy, the classification accuracy of different algorithms on three different datasets is shown in Table 2.

From Table 2, it can be seen that the proposed method outperforms all comparison methods on the three benchmark datasets. The only exception is the case where the travel destination classification problem outperforms the travel information dataset, where the approach on the travel destination dataset achieves slightly better performance. However, the performance of the proposed method in the sharing and commenting experiments is still second. The proposed method for reviewing the dataset at travel destinations significantly outperforms other methods.

Comparison from the aspect of running time: the running time of different algorithms on 3 different datasets is shown in Table 3.

From Table 3, it can be seen that the method proposed in this study has the least running time. Also, one can see that the running time is also related to the size of the dataset. For example, in the two smallest datasets, Travel Destinations and the Share and Review dataset, the runtime is shorter than that of the Travel Info dataset.

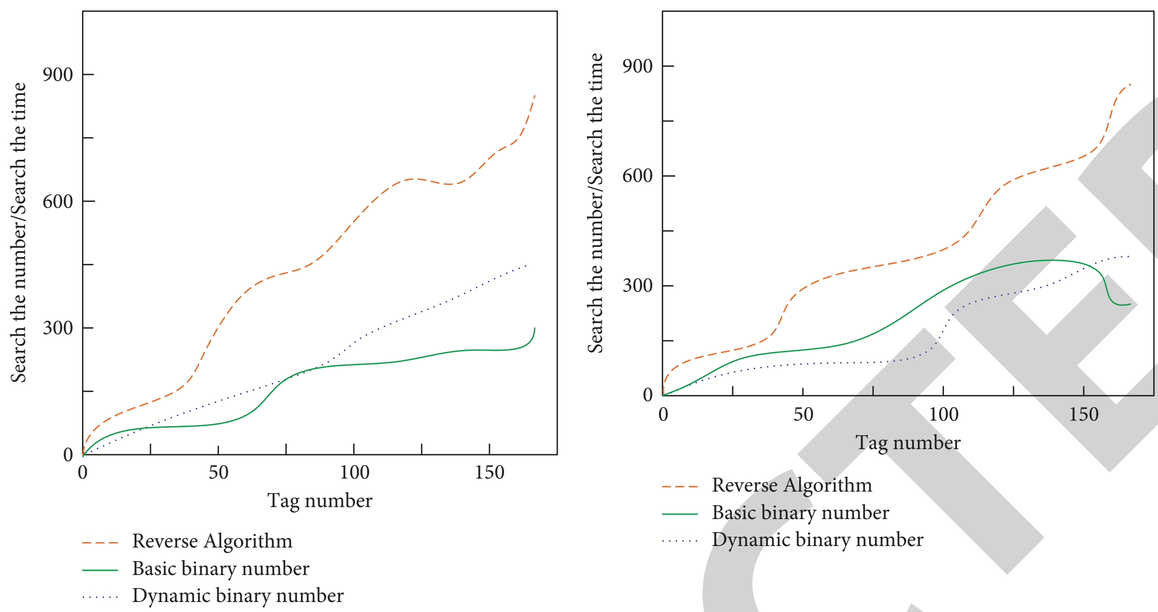
From this, it can be seen from the stability index and the RFID accuracy of the integrated platform of tourism and marketing that the test value of the index is fully in line with expectations within the design range. However, the reliability of the above indicators must be guaranteed for the management of the scenic spot ticketing system, environmental monitoring, and daily management of the scenic spot, so the RFID anticollision algorithm is tested. Radio frequency identification technology uses radio waves and noncontact fast information exchange and storage technology, through wireless communication combined with data access technology, and then connected with database system, to achieve noncontact two-way communication, so as to achieve the purpose of identification. In order to describe the advantages of the RFID anticollision algorithm, the basic binary tree algorithm, the dynamic binary tree algorithm, and the reverse algorithm are used as the control group, as shown in Figure 9.

It can be seen from Figures 9(a) and 9(b) that these three algorithms are relatively stable. The resulting accuracy of all three algorithms increases with the computation time, but the RFID accuracy and the time of the RFID anticollision algorithm perform the best.

4.2.2. Comparison of Different Loss Functions. The experimental framework uses three different loss functions to measure the classification error, and it can be seen that the classification accuracy of different methods varies with different loss functions, as shown in Table 4.

It can be seen from Table 4 that the differences between different loss functions are significant, which indicates that the method proposed in this study is robust to the selection of loss functions. Compared with the hinge loss function and the logarithmic loss function, the exponential loss function has the highest classification accuracy, and the hinge loss function has the lowest classification accuracy. Because the hinge loss function is a piecewise continuous function, it takes 0 when the classifier is completely correct. The nature of the hinge loss determines the sparseness of SVM, that is, the samples with correct classification but less than 1 probability and the wrong classification are identified as support vectors and are used to divide the decision boundary, and the remaining samples with completely correct classification do not participate in the model solution.

In this study, based on theory and experiment, the migration algorithm design algorithm is selected as the main algorithm for calculating the threshold. It mainly focuses on the characteristics and design ideas of the algorithm and constructs the structure, content, and applicable conditions of the interactive service mode of the eco-sustainable tourism integrated platform. However, the multilink and multidatasets in the running process of the algorithm lead to its variability. How to make the algorithm have a better self-adaptability during running to ensure stability during global evolution is also an important direction for future research studies.



(a) (b)

Figure 9: The stability index of the three algorithms for the platform and the change of the RFID accuracy: (a) variation of the stability index with actuarial calculations and (b) variation of the RFID accuracy with actuarial calculations.

Table 4: Classification accuracy based on different loss functions.

Method	Travel destination	Tourist information	Share and comment
Hinge loss	0.77	0.81	0.79
Log loss	0.83	0.87	0.85
Index loss	0.93	0.88	0.92

5. Conclusion

The biggest advantage of the integrated tourism and marketing platform lies in the release of resource value and the innovation of service products. All tourists who use the shared platform to obtain tourism resources can enjoy various types of tourism products and services more conveniently and preferentially and enrich the connotation and fun of tourism. This study mainly focuses on the design and implementation of platform applications and outlines the construction process of the development environment of the platform system. Second, in order to efficiently match services, on the basis of realizing the original accumulation of resources, this study modularizes and reorganizes resources with corresponding rules according to the function, quality, region, corresponding tourism links, and types of suppliers. The design process of the platform is introduced from the overall design and the detailed design, and the collaborative filtering algorithm and the route generation algorithm are used to build the platform through relevant key technologies, so as to realize the functions of each functional module and display the presentation effect. Finally, through the machine learning-based migration algorithm experiment, functional tests, performance tests, and comparisons of accuracy and performance are carried out on the application to verify the application and analyze the test results. Finally, it is concluded that the improved algorithm shows advantages in terms of data acquisition time and computational complexity. In the future, the main research direction should be attributed to the optimization and selection of control parameters using machine learning algorithms.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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