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ORIGINAL

SPORT-SUPPORTING APPLICATIONS OF PERSONALISED FEEDBACK TECHNIQUES IN THE LANDSCAPE DESIGN OF SPORTS SCENES

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ABSTRACT

Currently, people pay more and more attention to their own health condition, and have shifted from the traditional passive participation in sports to the active participation, which brings the national sports boom is more and more intense. In this paper, we believe that the landscape design of sports scenes should take into account the needs of the public's life and the development trend of changing from landscape form to focus on the harmonious relationship between the human body and the environment, and try to put forward the form of sports landscape in the field of landscape design of sports scenes, and combined with the personalized feedback technology to design an ideal sports landscape design program with a high degree of perception to do a preliminary investigation. This requires designers to provide personalized feedback services, so this paper introduces user interest subclasses, analyses the user's historical behavioral operations, obtains the user's rating value on the interest subclasses, and then calculates the user's interest distribution based on the rating value. Based on the idea of user interest subclasses, considering the local similarity of users, we spread the traditional collaborative filtering algorithm to different interest subclasses for the prediction of overall similarity calculation and rating. Then we combine the calculation results with the user's interest distribution to obtain the final recommendation list of the user. Based on the personalized feedback technology in the sports scene landscape design provides a new perspective and way of thinking, and we hope that the sports scene landscape can bring people a pleasant sports experience, but also can call on more people to strengthen the importance of sports and fitness.

KEYWORDS: Sport-Supporting Application; Personalised Feedback Techniques; Landscape Design; Medical Sports Scenes; Recommended System

1. INTRODUCTION

As we all know, a good life cannot be achieved without a favourable environment and active sports. In recent years, more and more people realise that sports and fitness is an important part of life under the influence of the call of "sports for all" and the Olympic fever. How to provide more "human-centred" sports landscape space for the public is an issue that we landscape designers should seriously face. Contemporary landscape design, no matter what type or theme, people focus on the visual perception, designers are too much to pursue the form of beautification, but the people's physical perception and behavioural experience needs to be ignored, which results in the relationship between people and the landscape is becoming more and more distant. Sports landscape design research is inevitably inseparable from the phenomenology of the body, with the introduction of foreign theories and the introduction of many scholars, people for the phenomenology of the body and sports landscape design gradually increase the importance of the combination of the degree of design, but the degree is far from reaching the state it should have (Cortesão & Lenzholzer, 2022; Enserink, Van Etteger, Van den Brink, & Stremke, 2022; Shan & Sun, 2021). This is mainly reflected in the following two aspects.

(1) The emphasis is still not high enough. Generally speaking, most people's understanding of the word landscape is visual-based. However, with the improvement of people's living standards, the public demand is also higher and higher, only from the visual form of landscape design to meet the public is far from enough, because people in the environment experience, is to rely on the unity of the multi-sensory to perceive, and not only to the visual main. Although visual perception is an important part of the experience process, if the unity of multiple senses, the interaction between people and landscape, and the contextual and narrative aspects of the landscape are integrated together to interpret the landscape, we will get a richer and deeper experience. The concept of phenomenology of the body proposed by Merleau-Ponty has been applied to the fields of architecture and medicine more often than not, but is rarely used in the field of landscape, even in contemporary sports landscape design, as shown in Figure 1, the human experience, behavioural needs and the landscape are well integrated into the case is relatively small, and most of the design of the sports landscape space is still relatively homogeneous and lack of humanistic care. At present, the most common sports space is the placement of some basic facilities, or for the simple creation of the atmosphere and set up some artificial music players, etc., people's spiritual needs have not been paid enough attention to and meet. Therefore, no matter for the consideration of multi-sensory experience of landscape, or in the research and

application of sports landscape design, we should pay enough attention to people's physical experience (Backman & Svensson, 2023; Woods et al., 2020). Under the perspective of the phenomenological philosophy of the body, we can see the lack of the essence of landscape design, but at the same time, it also allows us to pay enough attention to improve it, so as to improve people's perception of the sports experience(Davide, Marcello, Michele, & Miltiadis, 2021).

Figure 1: Schematic diagram of the sports scenes.

(2) Sports landscape design is not given enough attention. First of all, sports landscape design has not received enough attention, which inevitably leads to the research on sports landscape is also not deep enough. Secondly, some of the modern sports landscape space research angles are relatively narrow and not novel enough, most of them start from landscape gardening, spatial scale and so on, and there are very few cases where phenomenology, sports and landscape are combined together in the research, which affects the depth of the subject research. The general programme research is to understand the actual situation through the form of questionnaire survey, although this is also a good practical research method, but the sports landscape of this research involves the "body subject" problem, is a subject experience, the body phenomenology theory as a support is very necessary. If we ignore the body subject, perception and other issues, leaving the human body subject as the core of the design will be a lack of value and significance of the research. The higher the craze for "sports for all", the higher the demand for sports environment will be. Unilateral research from a certain perspective will be boring and uninteresting, more new perspectives may have more possible inspirations to burst out (Parent et al., 2023). From the design level, with the rise of the national sports boom, there are more and more theories and

concepts about sports landscape design, and the domestic research results on sports theme combined with landscape design are mainly focused on professional sports venues, most of the attention is paid to the technical aspects of urban or architectural design, and non-professional sports and leisure sports space close to and suitable for the public's daily life. There are very few non-professional sports and recreational spaces. Many of these designs only stay at the level of basic sports facilities, without considering the relationship between people, bodies and landscapes. Sports landscape is also an important part of the perceived world in our lives. Borrowing the philosophical theory of the phenomenology of the body and re-examining the nature of the sports landscape from a new perspective is of great significance both for the improvement of the perception of the sports landscape and for contemporary landscape design (Firdos, Meng, Hasyim, & Khlaif, 2022; Liu, 2021).

Like search engines, personalised feedback technology (Chen et al., 2023; Iraj, Fudge, Faulkner, Pardo, & Kovanović, 2020; Lim et al., 2020) also filters through massive amounts of data to obtain items of interest to users. The difference is that recommender systems can analyse different users' historical behaviours and usage habits to build up an interest model for the user, and analyse the user's characteristics of interest, so that the most relevant resources can be mined from the massive amounts of information and recommended to the user. Therefore, in a certain sense, the recommendation system is the inheritance and extension of search engine. The primary task of the recommendation system is to build a bridge connecting users and relevant resources to solve the problem of information hoof-selection of users. The essence of the system is to predict users' preferences for unselected resources by analysing their behaviours (parks, stadiums, etc. that they have selected), and to present the prediction results to the users in an efficient and friendly way. Personalised feedback techniques are of high academic value. Personalised recommendation technology is the inheritance and extension of data mining and machine learning. The research on recommendation technology can enhance the research level of data mining and machine learning malefactors, and at the same time, it can also broaden the research field of data mining and machine learning algorithms. In the current big data environment, the research of recommendation technology can solve many hot issues in the big data field and provide a good theoretical foundation for big data researchers. In terms of practical application, with the development of Internet technology, people's way of life has changed dramatically. The system that used to require users to actively obtain resources can quickly and accurately locate users' needs through the introduction of personalised recommendation technology, which provides strong support in the landscape design of sports scenes (Seçkin, Ateş, & Seçkin, 2023). The main contributions are as follows:

(1) This paper combines personalised feedback technology to make a preliminary investigation on how to design a landscape design scheme with a

high degree of perception for motion scenes. (2) In this paper, based on the idea of user interest subclasses, considering the local similarity of users, we decentralise the traditional collaborative filtering algorithms for overall similarity calculation and rating prediction to different interest subclasses for calculation. Then we combine the calculation results with the user's interest distribution to obtain the final feedback list of users.

2. Methodology

Therefore, this paper introduces user interest subclasses, analyses the user's historical behavioural operations, obtains the user's rating value on the interest subclasses, and then calculates the user's interest distribution based on the rating value. Based on the idea of user interest subclasses, considering the local similarity of users, we spread the traditional collaborative filtering algorithm to different interest subclasses for the prediction of similarity calculation and scoring for the whole. Based on the personalised feedback technology in the sports scene landscape design provides a new perspective and way of thinking, and we hope that the sports scene landscape can bring people a pleasant sports experience, and at the same time, it can also call on more people to strengthen the importance of sports and fitness.

2.1 Concept of Sports Landscape

Sports landscape refers to the actual needs of the participants, and combined with the site and green environmental requirements, to provide the public with a leisure time can voluntarily participate in the relaxation of the body and mind, entertainment and recreation and fun sports combined with the non-specialised sports space, in order to enrich people's lives and improve the overall quality of the body. Sports landscape contains many types, based on different perspectives can also be divided into many categories, from the scale, from large to sports parks, as small as the basic sports facilities or sports equipment. Moreover, due to the ambiguity and randomness of the behaviour of sports and leisure sports, there are many possibilities for sports venues. At the same time, the sports landscape described in this paper and the landscape sport we generally talk about are two different concepts. Landscape sports is a new form of sports that has been slowly formed along with the social and economic development, which refers more to a kind of sports and humanistic landscape phenomenon. The direction of the sports landscape concept studied by the author is closer to the meaning of "active sports landscape design", which is a combination of sports and leisure activity space and landscape design with sports characteristics, aiming to stimulate the public's enthusiasm for sports through sports landscape design, so as to achieve the whole population to strengthen the body and to get a certain amount of knowledge. The effect of popularisation of science, build up a good communication bridge between people and sports landscape.

Figure 2: Schematic diagram of fitness exercise scene

From the landscape design level, whether it is large to the theme of sports and leisure parks, or small to all kinds of sports and fitness space and facilities, these designs can seldom be people's perceptual experience and physical behavior, as well as the surrounding environment is well integrated together, such as some venues in the sports facilities are only to play a routine use of functional role, or even just furnishings. However, with the rise of the national sports boom, the sports landscape is also developing, and although there are many improvements that need to be made, it is also responding to the new needs of contemporary people's lives. As shown in Figure 2, sports parks integrate running tracks, green landscapes, and plazas to provide local citizens with more choices for physical activity than just the basics. The running track provides space for people to run and walk in the morning, the plaza area provides an activity area for people who like to dance in the square, and the prefabricated steel promenade provides busy young people with the possibility of stopping for a rest. Sports as the theme of the fitness park is also an important part of the sports landscape, the landscape environment and physical exercise, can play a certain positive impact on people's physical and mental health development and promotion.

Figure 3: Schematic diagram of the Pulse Park landscape

In addition, for the sports landscape Pulse Park, there are three innovative activity zones for exercise and enjoyment - a play zone, a sports zone and a contemplation zone - where the designers encourage local people to experience a variety of sports activities. The play area is a conceptual 'forest' scene, where lush trees are abstracted into geometric logs, which are used for climbing, weight training, swinging and other fun activities, making it a highly creative venue; and the sports area is a combination of concave and convex objects, where exercisers can skateboard, rollerblade and play with their hands. It can also be used as a training ground for Olympic athletes, where the speed of different sports can be controlled by the ground structure of the site; there is also a green and soft contemplative area, the centre of which is decorated by an artificial island and a river, and the latticework of the dome building, filled with greenery, stimulates all the senses, and creates a pleasant and peaceful atmosphere for people to exercise Pilates. This area creates a pleasant and peaceful atmosphere for Pilates exercises, as shown in Figure 3.

Figure 4: Schematic diagram of skateboard sports park

Figure 5: Schematic diagram of the comprehensive sports park

In addition, venues divided according to function should be reasonably organized and properly arranged. Based on the group objects of different age stages and the requirements of different sports activities on the venue, a multi-functional characteristic sports theme landscape is created so as to attract more spectators. In addition to highlighting the functionality of the theme, it should also enhance people's participation in the enthusiasm, so that the public have a sense of place presence and perceive the spirit of the place. In every venue

with clear functions, people should be able to integrate into the current environment, so that they have a good emotional communication space with the landscape. Even under the conditions allowed can invite the local people to participate in the design process, which can make the distance between people and the landscape a step closer, but also let the sports landscape space closer to the people's sport's needs.

Then, enrich the landscape devices, sketches and facilities of the game, through the enhancement of their game makes the body actively participate in it. And the playfulness cannot be separated from the inner core part of the sense of fun. The playfulness of vignettes and installations in sports landscapes has diverse potentials, providing multiple possibilities for the incorporation of recreational sports in contemporary landscape design. A landscape design that incorporates diverse, visual, digital media installations and multi-functional facilities is sure to catch the eye of the viewer.

Such a landscape allows the viewer to learn while entertaining, and achieves the function of education and enjoyment, and the communication between people and people, and between people and things can be further enhanced by such a sports space, as shown in Figures 4 and 5.

2.2 Related theories of sports scenes

2.2.1 Landscape ecology

Landscape ecology emphasizes the growth and development of various organisms in a certain space and the management and protection of the ecosystem. Nature has a complete self-healing system. As spring goes to autumn and the four seasons change, nature has its own laws and circulation system. In the design, it is necessary to consider the integration of ecosystem and cultural landscape, respect biodiversity, protect water resources, maintain the stable development of ecosystem, and ensure the harmonious coexistence between man and nature.

2.2.2 Environmental psychology

Environmental psychology studies the interaction between human behaviour and the environment. There is an inevitable connection between environmental structure-oriented interference and personal emotional interference. When people sit on the leisure seats on both sides of the garden road, they prefer to face the garden road and back to the shrubs and trees. This is influenced by the psychological need for security.

Wherever there is water, there are people. Water is naturally attractive to people, and people like to move around water. Places with waterfalls, fountains, and streams in parks are often crowded places. This is the gathering

effect of the water-friendly environment on people. Memorial parks or royal gardens often have larger spatial scales, reflecting their solemnity and shock; while private gardens in the south of the Yangtze River are smaller in scale and pay attention to "seeing the big from the small."

The openness of the garden is expressed through elements composed of points, lines, and surfaces. Covered bridges, pavilions, etc. shorten the distance between people and the spatial environment and create a landscape painting. These garden-scale design techniques affect people's visiting experience to a certain extent.

Therefore, in landscape design, we should pay more attention to the psychological needs of users, perceive the needs of users in different situations from the practicality, privacy and publicity of the landscape, and create a landscape space that caters to the comfort of users.

2.2.3 Sports aesthetics

Sports aesthetics studies the physical beauty, technical beauty and humanistic beauty in the process of sports. When the body moves, the beauty produced by the body's posture is called body beauty. Smooth muscle lines and balanced and slender body movements are the highlights of physical beauty. The beauty of technology is the strength and power displayed by people after their potential is stimulated during sports competitions. It embodies the intense and exciting unique form of sports.

It is also a comprehensive reflection of the beauty of body, strength and movement in sports aesthetics. Humanistic beauty emphasizes more on an implicit aesthetic experience, which mainly appears on the spiritual level during sports, such as fairness, justice, positivity, solidarity and cooperation, and other spiritual expressions. In the design of sports parks, designs with sports aesthetics should be appropriately added to meet the aesthetic needs of sports.

2.2.4 Sustainability

Landscape sustainability essentially refers to self-repair and renewal in natural ecology. Sustainable landscapes can enrich species diversity, build a complete biosphere, regulate stormwater systems, and maintain the balance of ground and groundwater.

As a new concept that has only been proposed in recent decades, modern new technologies are widely used in modern design, such as the use of solar lighting equipment to reduce urban energy consumption; permeable floor tiles to introduce surface water into the ground and use ecological depressions for construction Surface water filtration. The design of sustainable landscapes starts from the aspects of economic conservation and rational

utilization of ecology, which is conducive to the ecological design research of waterfront sports parks.

2.3 Subcategory collaborative feedback algorithm based on user interest distribution

2.3.1 Introducing user interest subcategories

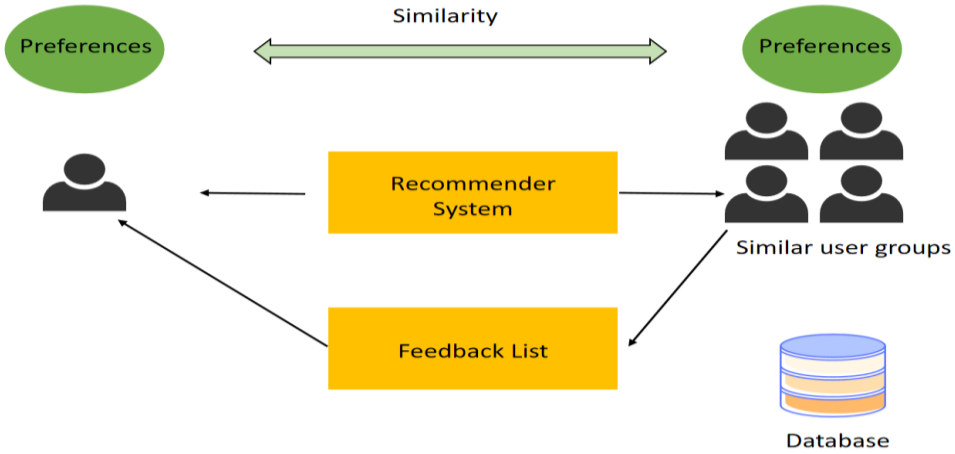

Figure 6: Schematic diagram of Feedback process based on co-filtering

Collaborative filtering recommendation has not only been deeply studied in academia, but also widely applied in the industry (Li & Cao, 2023). The basic idea of collaborative filtering is to obtain the similarity between two users or resource items based on the ratings of the users in the system through a similarity calculation formula, then rank the items based on the similarity results, obtain the nearest neighbours through the threshold K, and calculate the predicted value of the target user for the unrated items, and then generate the final feedback for the target users based on the predicted ratings in descending order, and Figure 6 illustrates a collaborative feedback process. The basic idea of traditional collaborative filtering recommendation algorithms is to find the nearest neighbours for a target user, and then predict the ratings based on the ratings of the nearest neighbours to generate the final recommendation list. In the process of finding similar user groups, traditional collaborative filtering algorithms treat all historical behaviours of users as a whole and do not take into account the distribution of user interests. There is a probability distribution of users' interests in different subcategories. How to get the interest distribution of users? The most direct way to show user interest in a recommender system is through user ratings. User's rating of a project is a good indicator of the user's interest in the resource, and the greater the user's rating of the project, the more interested the user is in the project, which is also the feedback from the user. In the actual system, users usually seldom express their interests to the system, so in order to obtain the interest level of users in the resources, it is necessary to analyse the behaviour of users to obtain implicit feedback from them. For

example, when users browse a certain document, their browsing time, favourites, downloads and other operations can well reflect the user's level of interest in the document (Walek & Fojtik, 2020). In practice, most of the time, implicit feedback from users can reflect their interests more comprehensively. In the system implementation, the implicit feedback data can also be converted into user rating data through appropriate mechanisms, thus participating in the system's rating prediction (Deldjoo, Schedl, Cremonesi, & Pasi, 2020). Based on the users' ratings and the correspondence between items and subcategories, we can further obtain the probability distribution of users in the interest subcategories. In the recommender system, we mainly analyse the user's history and behaviour logs to obtain the probability distribution of users in different interest subcategories, and the calculation equation is as follows:

$$Interest(C_k) = \frac{\sum_{j=0}^{N_j} j \in C_k(R_{ij})}{\sum_{k=0}^{N_k} \sum_{j=0}^{N_j} j \in C_k(R_{ij})} \qquad (1)$$

2.3.2 Nearest neighbor discovery based on user interest subcategory

Discovering the nearest neighbors of the target user is the core part of the collaborative filtering algorithm. Whether it is the UserCF algorithm or the ItemCF algorithm, it is necessary to analyze and calculate the similarity between users, thereby forming a set of nearest K neighbors of the target user, and then obtaining relevant recommendation results based on these nearest neighbors. The current methods for calculating user similarity are mainly:

(1) Cosine similarity, also known as vectorial similarity, is a measure of the similarity between two vectors, the ratings of user x and y, by using the cosine-clamping formula of the vectors. If R_x and R_j denote the rating vectors of user x and user y respectively, then the similarity S_{xy} between x and y can be expressed as follows:

$$S_{xy} = \frac{R_x \bullet R_y}{\|R_x\| * \|R_y\|} \qquad (2)$$

(2) Correlation Similarity. Let I_{xy} represent the set of items rated jointly by user x and user y, then the similarity S_{xy} between x and y, its calculation equation is as follows:

$$S_{xy} = \frac{\sum_{i \in I_{xy}} (R_{xi} - \bar{R}_x)(R_{yi} - \bar{R}_y)}{\sqrt{\sum_{i \in I_{xy}} (R_{xi} - \bar{R}_x)^2} \sqrt{\sum_{i \in I_{xy}} (R_{yi} - \bar{R}_y)^2}} \qquad (3)$$

(3) Adjusted cosine similarity. The difference in user rating scales is not taken into account in the related similarity method. The user's rating may be overall high, and the user's rating may be overall low. Therefore, many

improvements have been made to the similarity formula. The user's rating scale can be determined by the user's rating of the project. The average score is obtained, and then the scoring scale problem can be corrected by subtracting the average score. Then the similarity can be calculated by the following equation:

$$S_{xy} = \frac{\sum_{i \in I_{xy}} (R_{xi} - \bar{R}_x)(R_{yi} - \bar{R}_y)}{\|(R_{xi} - \bar{R}_x)\| * \|(R_{yi} - \bar{R}_y)\|} \quad (4)$$

2.3.3 Feedback based on user interest subcategories

After completing the similarity calculation on the user's interest subclasses, the system can obtain the set of nearest neighbours of the target user, and by choosing the value of nearest neighbours, we can finally obtain the particular nearest neighbours. In order to simplify the algorithm, this paper adopts the average value of the corresponding interest subcategories for the items not rated by the users. It is shown that this method can effectively improve the accuracy of the recommendation system by collaborative filtering. After obtaining the set of users' nearest neighbours, the next step is to perform a two-class calculation:

(1) Scoring Forecast. The purpose of rating prediction is to calculate the user's rating for any sports landscape in the subcategory of interest. If the nearest set of user x in a subcategory of interest is the user's predicted score $Score_{x,i}$ for a sports landscape, the equation is as follows:

$$Score_{x,i} = \bar{R}_x + \frac{\sum_y S_{xy} \times (R_{y,i} - \bar{R}_y)}{\sum_y \left| |S_{xy}| \right|} \quad (5)$$

(2) Top-N means that the top N items are selected for personalised Top-N feedback based on the users' predicted ratings of the unrated items in the interest sub-categories in descending order. In the process of generating the final feedback list, the distribution of users' interests should be taken into account when generating the feedback for the final users, since the interest level of users in each subcategory is different. We use the number of feedbacks on the interest subcategories to represent the different interest distribution of users. Let N be the number of final feedback items, then:

$$N_i = Interest(C_i) \times N \quad (6)$$

3. Experiment and Results

3.1 Research target

This paper takes the urban waterfront sports park as an entry point to explore the landscape design method of the urban waterfront sports park in the

context of the promotion of the concept of national fitness and the revival of waterfront vitality. The research includes:

(1) the study of concepts related to urban waterfront sports parks. The concepts, types and characteristics of the parks are summarized, and the theoretical framework is analyzed from the perspectives of landscape ecology, environmental psychology, sports aesthetics and sustainable landscape.

(2) Summaries and analyses the development and construction of sports parks in urban waterfront areas at home and abroad. Extract the design concepts and methods of urban waterfront sports park construction from the excellent cases in line with China's basic national conditions, point out the problems existing in China's existing waterfront green space, and analyses and study the reasons for them.

(3) Research on the design points and methods of urban waterfront sports parks. Summaries a set of landscape design methods to show the ecological nature of urban waterfront area and the theme characteristics of "sports" in the sports park and provide theoretical basis for the landscape design of Nanchang Peach Blossom River Sports Park in this paper.

(4) Nanchang Peach Blossom River Sports Park landscape design practice. Pre-theoretical research into specific design projects, in practice, the city waterfront sports park to further understand the research, improve the practice, optimize the design, the current situation of the site as shown in Figure 7.

Figure 7: Current status of sports park landscape design

3.2 Experimental setup of personalized feedback algorithm

The experimental setup consists of two parts, the experimental

environment setup used during the experiment and the hyperparameter setup of the model used, as shown in Tables 1 and 2.

Table 1: Experimental environment setup

TYPE	PARAMETERS
OS	UBUNTU 16.04
GPU	NVIDIA GTX1080
RAM	8G
PYTHON	3.6.5
TRANSFORMERS	3.0.2
PYTORCH	1.4.0

Table 2: Hyperparameter settings

HYPERPARAMETER	VALUE
BATCH_SIZE	64
DROPOUT	0.3
OPTIMIZER	ADAM
LEARNING RATE	1E-5
EPOCH_NUM	200

3.3 Experimental results and analysis

In order to validate the personalised feedback effect of this algorithm, we compare this algorithm (subclass collaborative personalised feedback based on user interest distribution and its temporal improvement algorithm) with the traditional algorithm (user-based collaborative filtering personalised feedback algorithm) in the experimental process. We also consider the impact of nearest-neighbour values and the sparsity of different data on the algorithm.

(1) The impact of the nearest neighbor value on the algorithm. The value of nearest neighbor will affect the recommendation effect of the system. In traditional recommendation algorithms, when the algorithm is sparse, it is difficult to obtain the nearest neighbors, but the advantage of this algorithm is that it is easier to obtain the nearest neighbors.

In order to test the effectiveness of the algorithm in this paper, we analyse the effect of the nearest-neighbour value on the performance of the algorithm in the case of sparse data. In the experiment, we randomly divide the user rating data into training set and test set, in order to achieve better recommendation results. We take P=0.7 in this experiment, and the value of the neighborhood number K is increased from 4 to 16, with an interval of 2. The experimental results are shown in Table 3 and Figure 8.

Table 3: Impact of nearest neighbour on algorithmic accuracy

K	TRADITIONAL ALGORITHM	OURS
4	0.8317	0.8286
8	0.8220	0.8154
12	0.8206	0.8035
16	0.8051	0.7856
20	0.8003	0.7956
24	0.8013	0.7928
28	0.8017	0.7978

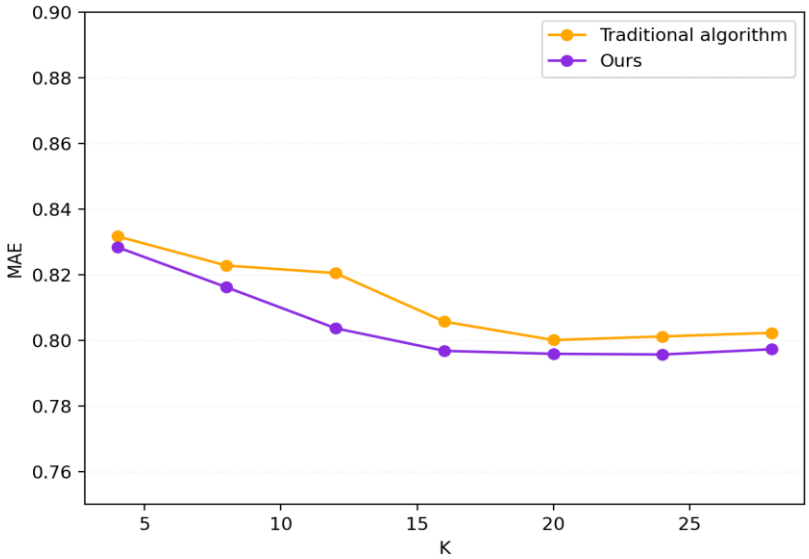

Figure 8: Impact of nearest neighbour on algorithmic accuracy

From Figure 8, it can be seen that the difference between the traditional algorithm and the present algorithm is not large when the values are 'and' respectively; when the values are 'and' respectively, the difference becomes larger. When the value is reached, the value starts to increase slightly as the number of neighbors continues to increase. The reason for this is that the traditional collaborative filtering algorithm for obtaining the nearest neighbors in the scoring matrix of the sports landscape design project is difficult to obtain the nearest neighbors and the user similarity is low. The algorithm in this paper is easier to get the nearest neighbors on the subclasses of user interests, and the users are closer in their interests and preferences, so the algorithm is more accurate. After the value reaches a certain value, as the value continues to increase, the new nearest neighborhoods become less similar and the error becomes larger and therefore starts to grow.

(2) The impact of data sparsity on the algorithm. The sparsity of the user rating data set will directly affect the accuracy of the recommendation algorithm. In the experiment, we selected the nearest neighbor for each user, and the

training set division ratios were 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, and 0.9 respectively. The experimental results obtained by using the traditional algorithm and this algorithm are shown in Table 4.

Table 4: The impact of data sparsity on algorithm accuracy

K	TRADITIONAL ALGORITHM	OURS
0.2	0.8258	0.8058
0.3	0.8213	0.8047
0.4	0.8201	0.8015
0.5	0.8149	0.7998
0.6	0.8053	0.7976
0.7	0.8001	0.7959
0.8	0.7989	0.7937
0.9	0.7977	0.7934

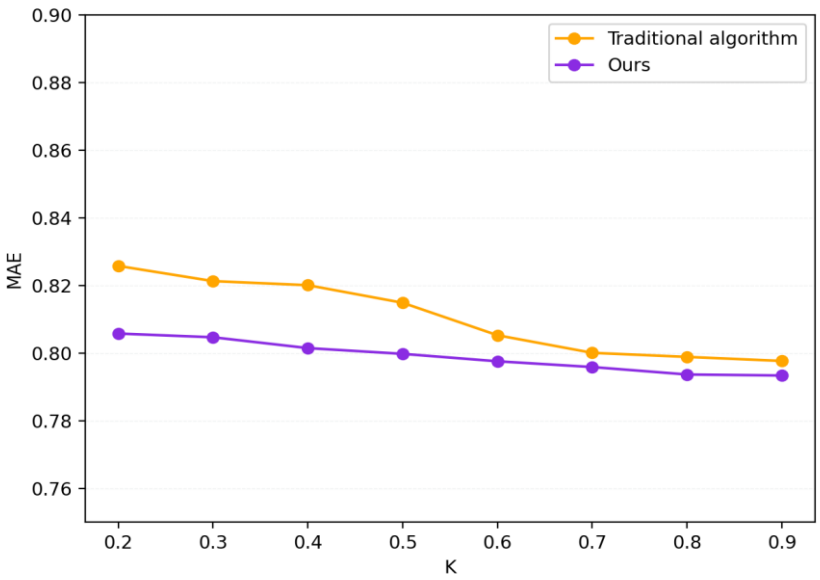

Figure 9: The impact curve of data sparsity on algorithm accuracy

From Figure 9, it can be seen that when the proportion of the training set is small, the bit difference between our algorithm and the traditional algorithm is larger, and the algorithm has better results in sparse data, and as the training set increases, the difference between the two decreases, and the recommendation results of the algorithms become closer to each other. The reason is that when the data is sparse, the training set provides less user information, and it is difficult to calculate the similarity of the obtained users in the whole domain, but the algorithm in this paper calculates the similarity on subclasses in order to improve the local similarity of the users, which is more accurate and smaller. As the proportion of the training set increases, the accuracy of the user similarity calculation of the traditional algorithm increases, and thus the two values are getting close to each other, which proves that the

personalized feedback technique is effective and superior in the landscape design of sports scenes.

4. Conclusion

In this paper, considering that sports scene landscape design should effectively consider the life needs of the public and the development trend of changing from landscape form to focusing on the harmonious relationship between the human body and the environment, an attempt is made to put forward some ideas in the field of sports scene landscape design. The form of sports landscape is combined with personalized feedback technology to design an ideal sports landscape design plan with high perception. This requires designers to provide personalized feedback services. Therefore, this article introduces user interest subcategories, analyzes the user's historical behavioral operations, obtains the user's rating value on the interest subcategory, and then calculates the user's interest distribution based on the rating value. Based on the idea of user interest subcategories and taking into account the local similarity of users, we use the traditional collaborative filtering algorithm to predict the overall similarity calculation and score and disperse it to different interest subcategories for calculation. Then the calculation results are combined with the user's interest distribution to obtain the user's final recommendation list. Based on personalized feedback technology, landscape design of sports scenes provides a new perspective and way of thinking.

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