Intelligent Learning-Based Optimal Allocation Method for College Physical Education Teaching Resources Using Heuristic Algorithms

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Abstract. This paper proposes an optimal allocation method of college physical education teaching resources based on heuristic algorithm. Using Apriori algorithm to cluster the teaching resources and realize the data mining of physical education resources; Preprocess the data of physical education resources, and clean the inaccurate records and duplicate data records; Calculate the distribution weight coefficient of resource data characteristics, set data classification objectives and fuzzy data mining classification structure; Set and reconstruct the edge range based on two-way association rules to complete the data classification of teaching resources; Establish the objective function of the optimal allocation of physical education teaching resources in Colleges and universities, and solve the objective function by heuristic algorithm to complete the optimal allocation of physical education teaching resources in Colleges and universities. The experimental results show that after the application of the method, the efficiency of resource utilization and resource allocation in Colleges and universities are improved, and the effect of optimal allocation of physical education teaching resources in Colleges and universities is improved.

Keywords: Heuristic algorithm; Physical education in Colleges and universities; Optimal allocation of resources; Intelligent Learning-Based
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1 INTRODUCTION

Physical education is an important part of university education and an important standard to measure the quality of education. How to give full play to the role of sports resources in physical education reform and create the best teaching effect with the least venues, equipment and teacher resources is one of the key links in the reform of colleges and universities. With the deepening of reform and the expansion of college enrollment, this contradiction has become increasingly prominent, which has also attracted greater attention[7],[5],[9] . Teacher resources are one of the important factors in the reform of physical education. The rational allocation of teacher resources is not only the fundamental to improve teaching quality and achieve good teaching results, but also the guarantee for the success of physical education reform. The concept of college sports resources is derived from the concept of sports resources[2],[13],[8]. The definition of college sports resources in Sports Management (1996 edition) is: the sum of all kinds of teaching venues, instruments and equipment, books and video materials, buildings,, the number of teachers, majors, businesses, abilities and various management activities associated with college sports activities. According to the existing form, college sports resources can be divided into tangible resources and intangible resources. Tangible sports resources are the material basis for schools to carry out sports activities, which generally refers to hard resources such as stadiums, sports facilities, sports equipment and equipment[10],[5],[12]; Compared with tangible resources, intangible sports resources include the intellectual or human resources of sports managers such as teachers' professional quality, ideological quality and teaching management ability. Intangible sports resources have great plasticity and initiative, and occupy a very important position in college sports resources. With the expansion of the enrollment scale of colleges and universities, the contradiction between the originally scarce physical education teaching resources and the increasing number of students is more prominent. In order to complete the task of physical education teaching and realize the goal of physical education teaching, actively develop and utilize teaching resources and alleviate this prominent contradiction has become an important issue to be solved urgently in the current physical education reform of colleges and universities.

The optimal allocation of physical education resources in Colleges and universities is an important factor affecting the high-quality development of higher education, realizing educational equity and improving the connotation of higher education[4],[17],[16],[1]. Although China attaches great importance to physical education and the total amount of educational resources invested has increased year by year, there are still some problems, such as insufficient investment, uneven allocation and low utilization efficiency. Therefore, how to realize the rationalization and benefit maximization of the allocation of physical education teaching resources in Colleges and universities has attracted the attention and discussion of all walks of life. From the perspective of policy changes, influencing factors, "double first-class" construction, regional economy and technical support, domestic researchers conduct theoretical and empirical research on the connotation, characteristics, influencing factors and existing problems of the optimal allocation of educational resources, and put forward corresponding suggestions for the optimal allocation of resources[10],[11],[3]. However, in terms of research content, these research results mainly focus on the broad allocation of educational resources in Colleges and universities, and there is less research on the allocation of physical education resources in Colleges and universities; In terms of research objects, it mainly focuses on Colleges and universities directly under the Ministry of education and higher vocational colleges, and there is less research on the allocation of physical education resources in ordinary local colleges and universities and colleges in a single province. In order to improve the optimal allocation effect of college physical education teaching resources, this paper puts forward the optimal allocation method of college physical education teaching resources based on heuristic algorithm to realize the optimization of educational resource allocation.

2 OPTIMAL ALLOCATION METHOD OF COLLEGE PHYSICAL EDUCATION TEACHING RESOURCES BASED ON HEURISTIC ALGORITHM

2.1 Data Mining of Physical Education Resources

In order to ensure the comprehensiveness of the distribution of educational resources, before allocating college physical education teaching resources, we must deeply mine college physical education teaching resources and cluster the teaching resources by using the Apriori algorithm in big data technology.

The same educational resource contains multiple features. It is necessary to mine association rules with minimum confidence and minimum support in massive data through big data technology, which mainly includes two parts: (1) mining frequent item sets with minimum support in transaction database; (2) The association rules of college physical education teaching resources are generated by using the mined frequent item sets.

Apriori algorithm is used to obtain frequent item sets with support higher than the minimum support. Apriori algorithm obtains k + 1 itemsets by using k itemsets through layer by layer search method.

B represents the transaction database, $I=\{I_1,I_2,\cdots,I_m\}$ represents the item set in the database, and I_i represents the elements in the item set. $W=\{T_1,T_2,\cdots,T_n\}$ and T_i respectively represent the transaction set and the elements contained therein, and satisfy $T_i \subseteq T$. All transactions T are identified with separate labels. The length or dimension of item set in massive data indicates the number of elements contained in the item set . When the number of elements in the project set is k, it means that the project set is k item set. There is a random college physical education teaching resource database B, and the process of mining its frequent itemsets is as follows:

1) Calculate all 1 itemsets, represented by C_1, and search all common 1 itemsets greater than or equal to the set minimum support, represented by L_1;
2) 2.Use the common 1 itemset to obtain the candidate 2 itemsets, which are represented by C_2. Search for all 2 itemsets greater than or equal to the set minimum support from the obtained 2 itemsets, which are represented by L_2 .
3) According to the above process, use the obtained common 2 itemsets to obtain the candidate 3 itemsets, which are represented by C_3. Search for all three itemsets greater than or equal to the set minimum support from the obtained three itemsets, which are represented by L_3 .
4) Repeat the above process until higher dimensional frequent items cannot be obtained, and terminate the iteration.

It can be seen from the above process that Apriori algorithm obtains the final frequent item set through continuous iteration, and forms too many candidate sets in the search process, which has high complexity and low operation efficiency. Therefore, the Boolean matrix is introduced into Apriori algorithm to make it suitable for massive big data mining. The massive database of big data is prone to excessive memory. The database needs to be segmented, and the segmented database will be scanned in segments. Suppose that there are N transaction databases that complete the segmentation, which are represented by $\{B_1,B_2,\cdots,B_N\}$. It can be seen that the number of Boolean matrices is N , which corresponds to the transaction database that completes the segmentation one by one. The process of obtaining frequent itemsets using Apriori algorithm optimized by Boolean matrix is as follows:

1.Set the number of copies of massive transaction database and determine the size of different copies. Initialize the loop variable to 1 and set the minimum support of Apriori algorithm.

2. Read B_i in the transaction database and map it to Boolean matrix R_i.

3. Calculate the local minimum support of R_i for B_i using the following formula:

$$\mathrm{mins}_i = \mathrm{mins} \times \frac{|B_i|}{|B|} \tag{1}$$

In formula (1), $|B_i|$ and $|B|$ represent the number of elements in the transaction database and the number of elements in the massive transaction database, respectively.

Obtain the corresponding row vector of the frequent item set in B_i in Boolean matrix R_i through formula (1), save the row vector obtained by searching, release the memory space of Boolean matrix R_i to update the data set, and obtain the updated matrix R_i.

4. Set $i = i + 1$, and when $i \le N$ condition is met, return to step (2) to repeat iterative calculation; Otherwise, go to step (5);

5. Recombine the corresponding Boolean matrix R_i of all frequent itemsets in transaction data set B_i, and establish a new Boolean matrix represented by $R = (R_1, R_2, \cdots, R_N)^T$. Thirdly, search the minimum support of the new Boolean matrix, determine the corresponding row vector of the frequent item set of the massive transaction database B, and obtain the frequent item set of the college physical education teaching resource database. According to the above process, the data mining of college physical education teaching resources based on Apriori algorithm is completed. The mined teaching resources are finally integrated into a unified database to provide basic data basis for the allocation of college physical education teaching resources.

2.2 Data preprocessing of Physical Education Resources

The preprocessing of physical education resource data is mainly to process database resources in different formats, including data resources, human resources, equipment resources and so on. Preprocessing can not only remove abnormal data and duplicate data in the database, achieve the purpose of format standardization, provide support for the subsequent resource allocation process, reduce the dimension of high-dimensional feature vector space, reduce the calculation process and improve the efficiency of resource allocation.

2.1.1 Inaccurate record of cleaning

Cleaning inaccurate records is mainly to identify the abnormal attributes in the resource data set. Give each attribute corresponding weight, count the average value and standard deviation of each attribute field value, set the attribute confidence interval accordingly, and judge whether the attribute is abnormal according to whether the attribute value is within the confidence interval[15],[6],[7],[14]. The distance based clustering algorithm can judge whether the attribute is abnormal according to the distance between the attribute value and the clustering.

If the distance between at least part a of dataset S and Object Q is greater than b, object Q is the distance based outlier of parameters a and b, i.e. $Qb(a,b)$. That is, outliers based on distance are regarded as objects lacking enough neighbors.

The multi-dimensional index structure of the index algorithm is used to find the neighbors of each object Q within the radius b. Let M be the maximum number of objects in the b domain of an outlier. Once the object Q is found to be less than $M+1$ neighbors, Q is an outlier, that is, abnormal data. The schematic diagram of outlier judgment process is shown in Figure 1:

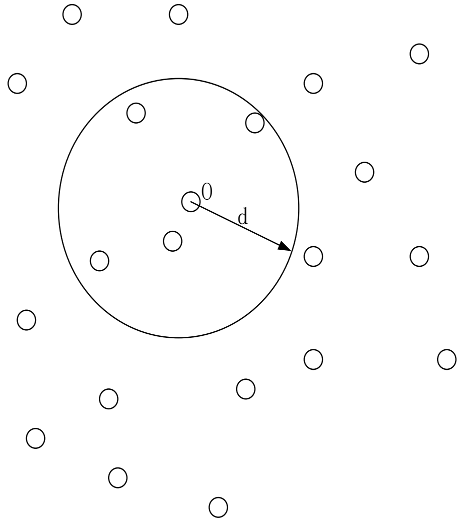

Figure 1: Property Value is Separated from the Cluster Distance.

2.1.2 Cleaning duplicate data records

In order to clean similar duplicate resources in the data set, this paper uses the Bayesian network algorithm in Python machine learning technology to clean up the duplicate record tuples of educational resources.

Set $Z = T_1, T_2, \cdots T_n$ as the tuple with duplicate data in the attribute value. Confidence to find tuple Z using user $Q*$:

$$Score(T) = \sum_{T \in Q} \Pr(T*) \Pr(T*|T) R(T*|Q*) \tag{2}$$

In the formula $R(T*|Q*)$ represents the association function. If the repeated tuple T matches the user's query $Q*$, the correlation degree is 1, or 0 otherwise. Specify a threshold value of $E(T)$ as required（3）

$$E(T)=\prod_{t=1}^{n}E(T_n|\pi_T) \tag{3}$$

Set the value of $E(T)$ between 0 and 1 according to the demand. If the above result exceeds this threshold, it is considered to be a duplicate record. Use the auxiliary tool scikit learn for cleaning operation.

To sum up, the data mining technology is used to mine and clean the college physical education teaching resource data, and then the appearance, location, causes and measures of the defect data are manually marked and saved in the resource database to provide data support for resource allocation.

2.3 Classification of Teaching Resources

To realize the classification of teaching resources, we need to set the classification goal of characteristic data. The so-called feature data classification goal is different from the ordinary data classification goal. Through the extraction of data features, the specific classification level is defined. It should be noted that the set data classification level is generally driven by classification objectives and forms corresponding classification tasks in combination with mining instructions . The completion process of educational resource classification objectives and tasks is shown in Figure 2.

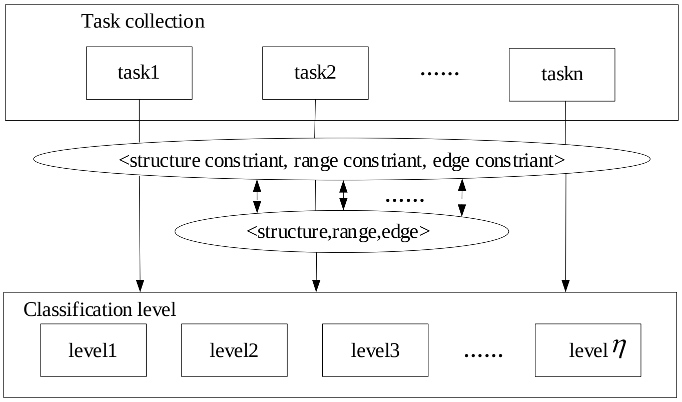

Figure 2: Schematic Diagram of Educational Resource Classification.

According to the classification process shown in FIG. 2, combined with the above data distribution preprocessing environment and the obtained data information, the data characteristic distribution weight coefficient of university physical education resources is calculated, as shown in formula 1:

$$T=\sqrt{2+\zeta}-\frac{1}{3C} \tag{4}$$

In formula (4): T represents the characteristic distribution weight coefficient of teaching resource data, ζ represents the weight change value, and C represents the change distance.

Through the above calculation, the actual data characteristic distribution weight coefficient can be obtained. According to the change of weight coefficient of data feature distribution, eliminate the existing difference value, and set specific application data classification objectives and fuzzy data mining classification structure.

Combining the actual number of data, the actual classification range of the data is preset. At the same time, under reasonable standards, the fuzzy feature distribution set of the determined data is set to $Y=\{\vartheta_{-1},\aleph_0,\upsilon_1\}$, and the actual application range of data mining is defined within the range of [-1,1].

At the same time, combined with the set characteristic data classification objectives, a more complete data classification architecture is formed in the initial classification structure framework. According to the value corresponding to the data type of physical education teaching resources in Colleges and universities, the maximum range value is extracted; According to the feature template, the classification control index is set, and a multi-level and multi-objective adaptive classification structure is constructed on the basis of feature weight regression analysis; Combined with the setting of classification objectives, the design and application of fuzzy data mining classification structure are finally completed.

According to the classification structure of fuzzy data mining, a two-way association data mining classification model is constructed. Firstly, the data of physical education teaching resources in Colleges and universities are initially classified according to the structure. At the same time, combined with the actual processing situation, delimit the basic classification conditions and processing standards, and verify and calculate the two-way mining ratio of the data classification model within a reasonable range, as shown in formula (5):

$$X=\frac{\eta+1}{3}-\sqrt{1.25+\rho} \tag{5}$$

In formula (5): X represents bidirectional mining ratio, η represents classification level constant, and ρ represents adaptive repetition coefficient. Through the above calculation, the actual two-way excavation ratio can be obtained.

According to the mining ratio, combined with data mining technology and association rules, probit multiple regression data classification model is constructed. At the same time, the data classification requirements of colleges and universities are associated in the model to create a discrete classification data processing environment.

Fuzzy statistics of data based on two-way association rules; Set the high-level data classification sequence, and delimit an allowable error standard between each classification processing sequence, which is generally set to 0.15. With the support of data mining technology, set the specific data distribution set. On this basis, it is also necessary to adjust the association classification coincidence degree of the two-way association data mining classification model, and calculate the specific data classification adaptability function, as shown in formula (6):

$$O = (h + \frac{g+3s}{2}) - \sqrt{5c} \tag{6}$$

In formula (6): O represents the fitness function, h represents the classification and clustering constant value, g represents the existing data error present, s represents the limit error allowed, and c represents the feature extraction coefficient.

Through the above calculation, the actual adaptive function can be obtained. Add it to the two-way association data mining classification model, further optimize and improve the corresponding classification results, and improve the reliability and accuracy of the data classification of physical education teaching resources in Colleges and universities.

Based on the two-way association data mining classification model, the feature reconstruction method is used to classify the data of college physical education teaching resources. Combined with the initial data classification characteristics, set the change framework, reconstruct the coverage, and flexibly change the setting of data classification standards of college physical education teaching resources.

Based on data mining technology, set the reconstruction edge range and formulate the reconstruction classification edge value, as shown in Table 1:

Reconstruct coverage	*Marginal value*	*Reconstruct the edge ratio*
0.25~1.36	*0.21*	*1.2*
1.36~2.05	*0.33*	*1.14*
2.05~3.44	*0.35*	*1.32*

Table 1: Standard Setting of Edge Value of Reconstructed Data Classification.

According to table 1, the standard of edge value of reconstructed data classification can be set. After completion, combined with the data classification standards set above, the data classification of college physical education teaching resources under data mining technology is finally realized.

2.4 Constructing the Optimal Allocation Function of College Physical Education Teaching Resources Based on Heuristic Algorithm

According to the above classification results of college physical education teaching resources, the teaching resources are optimized based on heuristic algorithm. In order to optimize the allocation of physical education resources in Colleges and universities, the following two objectives are put forward: (1) improve the utilization efficiency of physical education resources in Colleges and universities. That is to organize limited resources and give full play to the maximum educational output. (2) Improve the allocation efficiency of physical education resources in Colleges and universities. That is to maximize the proportion of educational resources in various input resources. At the same time, it is also necessary to consider the complexity and particularity of each kind of resources and the impact on educational achievements, so as to effectively allocate each kind of resources to the most suitable aspects.

1) Utilization efficiency of physical education teaching resources in Colleges and Universities

College physical education teaching resources are affected by many factors, and their allocation belongs to non-simple linear distribution. The ultimate goal is to maximize educational achievements, that is, the utilization efficiency of college physical education teaching resources is the ratio of educational output to educational investment, and its expression is

$$U = \frac{\sum_{j=1}^{m} \gamma_j Q_j}{\sum_{i=1}^{n} \mu_i \kappa_i} \tag{7}$$

In the formula: i and j represent educational resources and educational achievements respectively; Q_j and κ_i are the output and input of educational resources respectively; γ_j and μ_i are the input indexes and output index weights of educational resources respectively.The larger the U value, the larger the proportion of input-output, the higher the utilization efficiency of educational resources, the more reasonable the combination of educational production factors, and vice versa.

According to the university physical education teaching resources input-output index system, in turn, teachers and students have administrative teachers, students have teaching teachers, student physical training equipment value, student sports indoor training area, student sports outdoor training area and student physical education funds seven education resources allocation efficiency index.The expression of the i educational resource allocation k objective function is:

$$A_{ki} = \frac{X_k + \triangle X_k}{S_k}, k = 1, 2, \cdots, K \tag{8}$$

In the formula, S_k is the number of students in university k; X_k and $\triangle X_k$ indicate the mean value and change of physical education resources in university k respectively.

Considering the formula (7) and formula (8) objective function, the multi-objective optimization function of resource allocation is:

$$\max U_k = \frac{\sum_{j=1}^{m} \gamma_j Q_j}{\sum_{i=1}^{n} \mu_i \kappa_i} \tag{9}$$

$$\max F_k = \sum_{i=1}^{n} \mu_i A_{ki}, k = 1, 2, \cdots, K \tag{10}$$

In formula: $\max U_k$ is the maximum efficiency of educational resources utilization in colleges and universities; $\max F_k$ is the maximum efficiency of educational resource allocation in colleges and universities.Among them, the index weights γ_j and μ_i have different effects on physical education in colleges and universities. Therefore, it is necessary to use entropy weight method to calculate the weight of each factor. Based on the calculation results, Delphi method is used to carry out expert opinion consultation on the rationality and effectiveness of the evaluation index weight. After two rounds of consultation, feedback and revision closed-loop process, the input-output index weight of educational resources is finally obtained.

The objective function is solved by heuristic algorithm. The heuristic rules followed by the heuristic algorithm are as follows: (1) try to ensure the goal of high priority resource allocation; (2) select resource allocation objectives guided by the principle of balance, efficiency and proximity.

Step 1: establish a conflict matrix between configuration objectives to judge whether there is a conflict between resource types and target configuration tasks. Conflict resolution for configuration targets. Set the preconfigured initial time t = 0.

Step 2: the configuration targets are arranged in the order of priority from large to small and put into set D.

Step 3: find out other available arc segments corresponding to the allocation target of resources, and re select the arc segments according to the heuristic rule (2).

Step4: if the target in D has been traversed, the solution process ends; Otherwise, switch back to Step3.

Thus, the optimal allocation of physical education teaching resources in Colleges and universities is completed.

3 EXPERIMENTS AND ANALYSIS

3.1 Experimental Indicators

Taking ordinary colleges and universities in East China as the research sample, this paper makes a field survey on the physical education resources of 6 colleges and universities. The respondents are the directors of the Physical Education Department of each school. Taking the statistical data of the local department of education on physical education resources as the basic database, referring to the theories of human resource management and investment economics, this paper investigates the structure and function of public sports resources in Colleges and universities in East China by means of questionnaire. The questionnaire design is based on the structural and functional framework of "human resources, material resources and information resources", which extends the specific measurement indicators, which have been demonstrated and modified by 12 experts. The validity coefficient of the questionnaire was 0.94. A total of 60 questionnaires were distributed and 40 valid questionnaires were recovered, with an effective recovery rate of 66.7%. All data were statistically analyzed by SPSS software.

Considering that each educational resource has different dimensions and dimensional units, in order to eliminate the dimensional impact between indicators, normalize the input-output index data of physical education resources in Colleges and universities, and obtain the following input-output index weights of educational resources, as shown in Table 2 and table 3 respectively.

Index	*Weight*
All students have administrative teachers	*0.194*
All the students have teaching teachers	*0.237*
Sports training equipment per student	*0.258*
Sports indoor training ground area per student	*0.239*

Outdoor training ground area for sports per student	*0.273*
Funding for physical education per student	*0.312*
Teacher student ratio	*0.201*

Table 2: Weight of physical education resources input index

Index	*Weight*
Number of educated students	*0.194*
Students should master sports skills	*0.237*
Students meet the physical fitness standards	*0.258*
Student sports competition results	*0.239*
Student satisfaction with physical education	*0.273*

Table 3: Weight of the Output Indicators of Physical Education Resources.

It can be seen from table 2 and table 3 that among the input resources, the funding resources of physical education in Colleges and universities account for the largest weight, that is, they have the greatest influence on the output of physical education in Colleges and universities, followed by the number of sports training equipment per student and the area of outdoor sports training venues per student.

According to the results of the questionnaire, the distribution of physical education resources in Colleges and universities in East China at this stage mainly includes the following problems. Firstly, the utilization efficiency of educational resources is low. While the supply of sports resources in Colleges and universities is insufficient, it presents the problem of extremely low resource sharing rate caused by segmentation, and the coexistence of insufficient resources and waste of resources. From the perspective of venue construction and planning awareness, colleges and universities have an obvious awareness of seeking greatness, perfection and standardization in the construction of gymnasiums. Most schools have large standardized gymnasiums, which have relatively single functions. In addition to carrying out limited competitions and activities every year, they are idle for a lot of time due to high maintenance cost and low utilization rate; On the other hand, the existing functional structure of university stadiums does not match the demand structure of students for sports. From the perspective of resource sharing, the sharing rate of stadium resources is low. In the survey, it is found that 72.5% have been or will be relocated to the new higher education park, but there is a lack of sharing mechanism with schools in the park in terms of sports resources, and the phenomenon of segmentation is very obvious. In addition to the above problems, under the influence of the traditional teaching guiding ideology, too much emphasis is placed on the competitiveness of sports events, resulting in the competitive standardization tendency of stadium (gymnasium) construction and equipment allocation, resulting in the phenomenon of idle resources in the case of insufficient resources. Secondly, there are great differences in resource allocation between colleges and universities. For example, in terms of teacher allocation, 78 physical education teachers in the surveyed schools have undertaken the organization and guidance of physical education teaching and related physical activities of more than 100000 students; At the same time, there is a lack of talents with master's degree or above, high professional title and special expertise. The number of full-time and part-time teachers in Colleges and universities is large, while the number of administrative teachers is small, and there are obvious differences in resource investment among colleges and universities. Finally, there are also great differences in the allocation of resources within colleges and universities, such as the imbalance between the number of teachers per student, the investment of special funds per student and the area ratio of practice base per student in schools in different regions. It can be seen that there are no clear standards for resource allocation in Colleges and universities, and there are great differences in resource allocation. In addition, from the perspective of sports funds in Colleges and universities, the investment of sports funds is one of the prominent problems that perplex and affect the development of school sports work. In recent years, despite the improvement of college sports funds, the overall situation can not meet the needs of the current development of college sports. The problems such as the single source of sports funds, the unreasonable use structure of funds, the poor channels of income generation, and the poor autonomy of sports departments have become more obvious. Only 10% of the directors of the school's physical education department (Office) believe that the school's physical education funds fully meet the needs of physical education teaching and training; 52.5% of the directors of the school's physical education department (Office) believed that the school's physical education funds could basically meet the needs of physical education teaching and training; Another 37.5% of the directors of the sports department (Office) of colleges and universities believe that the sports funds of the university are seriously insufficient. The average annual sports expenditure of the six colleges and universities surveyed is 105600 yuan. This situation is difficult to adapt to and meet the current development needs of college sports, and there are great differences among different types of schools. Even some schools are difficult to guarantee normal teaching.

3.2 Comparative Analysis of Experimental Results

In order to verify whether the optimal allocation method of college physical education teaching resources designed in this paper improves the utilization efficiency of resources, the experimental results of the optimal allocation solution are analyzed. Calculate the resource utilization efficiency of colleges and universities before and after the experiment, and the obtained data are shown in Figure 3.

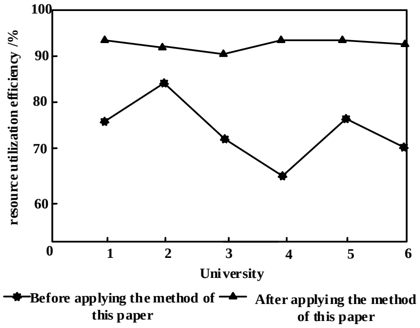

Figure 3: Changes in Resource Utilization Efficiency in Universities.

After the experimental application method, the resource utilization efficiency of each university is improved, and the resource utilization efficiency tends to be in equilibrium. Test whether the resource allocation method improves the resource allocation efficiency, and the test results are shown in Figure 4.

Allocation efficiency of physical education resources in Colleges and Universitie. As can be seen from Figure 4, the resource allocation efficiency of each school is significantly improved after the application of the method in this paper, which shows that the allocation of educational resources can be optimized by adjusting the quantity and structure of educational resources.

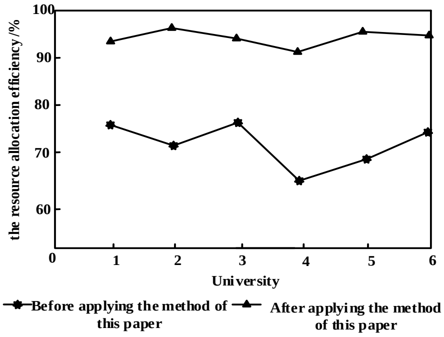

Figure 4: Changes in Resource Allocation Efficiency in Universities.

4 CONCLUSION

The optimal allocation of physical education resources in Colleges and universities is not only related to the development of colleges and universities and the cultivation of regional talents, but also related to the improvement of the overall level of national higher education and the scientific use of national higher education resources. This paper puts forward an optimal allocation method of college physical education teaching resources based on heuristic algorithm. Using Apriori algorithm to mine the data of physical education resources; Set data classification objectives and fuzzy data mining classification structure; Complete the data classification of teaching resources based on two-way association rules; The heuristic algorithm is used to optimize the allocation of college physical education teaching resources. The experimental results show that this method can improve the utilization efficiency and resource allocation efficiency of physical education resources in Colleges and universities.Intelligent learning techniques, such as two-way association rules, can be applied to complete the data classification of teaching resources. By establishing associations between different resources based on their characteristics, the interrelationships and dependencies among resources can be identified. This information helps in determining the optimal allocation of resources, considering factors such as availability, demand, and specific requirements of different physical education programs.

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