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Automatic Evaluation Model of Physical Education based on Association Rules Algorithm

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Abstract: Generally, the universities use the method of the quantitative evaluation to realize the objective evaluation of the teaching situation, and reflect the teacher's actual teaching situation through the quantitative scoring in all aspects. Scientific and accurate teaching evaluation is of far-reaching significance for teaching workers to further improve their teaching level. However, due to the influence of objective factors such as ideological understanding, teaching contents, evaluation methods and evaluation criteria, there are still many optimistic situations in PE teaching evaluation. In this paper, we use the algorithm of association rules in data mining to try to find out an effective way to analyze teaching evaluation data. Association rules are one of the important methods of data mining. They can find frequent itemsets from a given data set and the links between the data, and can find the contact of multiple data items that meet a certain degree of support and confidence.

Keywords: Association rules; Algorithm; Physical education; Automatic evaluation; Mode; Research

1. Introduction

Generally, universities use the method of quantitative evaluation to realize the objective evaluation of the teaching situation, and reflect the teacher's actual teaching situation through the quantitative scoring in all aspects. At present, the use of evaluation data in colleges and universities remains at the surface of the data. Only the rewards and punishments are taken by the level of the scores, and the underlying laws behind the data lacks deep understanding and excavation. As a result, the value of big data cannot be effectively utilized. Therefore, the use of association rules algorithm to evaluate the results of data mining, management and decision-making in colleges and universities have practical significance.

Data mining is the process of extracting hidden, potentially unknown and sometimes potentially informational and knowledge implicit in large, incomplete, noisy, vague, randomized data. Association rules are one of the important methods of data mining. They can find frequent item sets from a given data set and the links between the data, and can find the contact of multiple data items that meet a certain degree of support and confidence. It should be noted that the proposed algorithm is based on the premise that association rule generation is to discover item sets that occur with a certain probability. The generation of uncertain rules in rough set method is to find the condition attributes and decision attributes that appear with a certain probability of combination. If an item set is infrequent, then its superset is infrequent. Utilizing this property can greatly reduce the computational load and reduce the memory consumption. But this property cannot be used directly in the efficient mining of item sets. Therefore, this problem and it brings a huge challenge to efficient item set mining.DM refers to those from large databases in a specific algorithm for automatic extraction and processing in a process of the useful information, the database information forms may be varied, and DM's aim is to discover data hidden relationships, patterns, the process of association, rules with laws and so on.

Data mining work is carried out on a massive database as the scale of the database has a great impact on the mining time of the rules. Due to the large amount of data contained in the original database, there are many different types of data involved. And the rich variety of the data tables, each table contains many attributes. According to the selected subject of the classification of some irrelevant list, and select the properties of the table to be selected from the following steps.

First, find the set of positive and negative associations, and select only the rules with the highest degree of confidence in all the rules of the preceding part. If the confidence of the rule is greater than the support degree of the latter, it is the candidate rule, which guarantees the positive correlation between the former and the latter.

Categorization often produces a large number of candidate rules, pruning techniques to remove redundancy or noise information. Pruning techniques used in the generation of candidate rules are as follows: Delete the item sets

whose information entropy is close to 1, such item sets have little classification information. When a rule is added to a candidate rule set, the rule is deleted if its generalization rule already exists and the generalization rule's confidence level is greater than the special rule's confidence level. Sort the rules after the candidate rules are generated, and then use the database covering technology pruning similar to the CBA algorithm.

Teaching evaluation is an essential part of teaching activities, it is an effective means to understand the teaching situation and evaluate teaching effectiveness. It is also an effective way for teachers to determine the teaching objectives, select teaching methods and means, grasp the heavy and difficult teaching, master the learning situation of students, adjust teaching strategies, improve teaching measures and solve existing problems. At the same time, it is also an important basis for educational administration departments to assess the performance of teachers, allocate teachers' resources and improve the curriculum system.

Teaching evaluation is a special inspection and summarizing activities. The teaching evaluation is through the perfect teaching evaluation system and the existing methods and methods, to objectively evaluate the teaching value and put forward the corresponding teaching evaluation. Including the teaching environment, teaching content, teaching methods, teaching content of the quantitative evaluation. Simply put, the teaching evaluation is to evaluate and appraise the teaching quality. Through the evaluation of teaching, we can find out the problems in the teaching process through the teaching of all aspects to find out the deficiencies. At the same time, we can also urge the teaching managers and teachers to improve the methods and improve the teaching methods. Teaching environment, enrich teaching content, innovative teaching mode. Therefore, the scientific and accurate teaching evaluation of teaching workers to further enhance the level of teaching is of far-reaching significance. However, due to the influence of objective factors, such as ideological understanding, teaching content, evaluation methods and evaluation criteria, there are still many optimistic situations in PE teaching evaluation, which seriously weakened the practical guidance of teaching evaluation.

2. Physical Education Evaluation based on Association Rules

2.1. Association rules algorithm

Association rules are mainly used to find the potential contact between the attributes of the transaction, and provide strong support for the related decisions of the transaction. In the teaching evaluation system of colleges and universities, using association rules to mine a large amount of evaluation data can find many potential useful values. For example, teachers with doctorates in teaching staff have the highest quality of teaching. Therefore, it can be inferred that the quality of teaching has an important relationship with the academic qualifications of teachers. Colleges and universities can encourage teachers to further their studies and improve their personal qualifications so as to enhance their teaching level.

The basic idea of the algorithm is that a rough set method is used to generate a reduced Dreduct for a given decision table DT, and the subtraction of unimportant attributes is beneficial to the efficiency of the Apriori algorithm. Then the table is transformed into a new bitmap structure Decision table DT ', and uses the frequency set recursion idea of association rule mining algorithm A research ori algorithm in the new decision table to find the association mode between the condition attribute value and the decision attribute value. In this algorithm, Apriori's property that "all non-empty sub-sets of frequent sets must also be frequent" is valid and can significantly reduce the number of candidate sets. HUI-Miner does not need to produce candidate item sets, but directly produce high utility item sets. First produced a series of data structure called utility list, for utility information storage transaction information, set the item and overestimate the utility of information (residual utility). By scanning the list of the utility generated high utility all set, and this as the process does not require any candidate item sets, HUI Miner algorithm in running time and memory consumption are better than the above algorithm. HUI-Miner has a large number of utility lists, consumes storage space and affects the performance of the algorithm. In addition, because the algorithm not only stores the set of transaction and utility information in the utility list, but also stores information for searching space Extra pruning utility information to be pruned, which also reduces mining performance and takes up more memory resources. Due to the correlation analysis of the number of the association rules is very big, not all association rules is meaningful, in the specific application, also need to use commercial understanding means to get association rules for the selection and puts forward, keeping the meaningful valuable rules apply to the customer. The decision tree is the value of each attribute node of each sample attribute as a branch of a tree structure, which is analyzed by dealing with these nodes.

The general principle of decision tree using the theory of information theory, on the analysis of the large sample attribute case, can automatically generate decision tree system, the root node represents the initial state of the decision tree, each node of the decision tree representation of an object, each branch said the possibility of this object, in all samples in an intermediate node tree is a subset of the root node, and the root node contains information content attribute most.

Affairs and items. Transaction refers to the description of the object, the item refers to the properties that the trans-

action may have, and generally describes the association between the transaction and the item in the form of a data set. As shown in Figure 1, each row of the dataset represents a set of records, corresponding to the description of a transaction, each column represents a possible attribute of a transaction, and the entire data table is referred to as the entire transaction set of the database. A row of a column of data as "1" indicates that the transaction line with that column refers to the property, data "0" indicates that the transaction does not have the property.

Table 1. Data set list

Tin	A	B	C	D	E	F	G
1	1	0	0	1	0	1	1
2	0	1	0	1	1	0	1
3	1	1	1	0	1	0	1
4	1	1	0	1	1	1	1

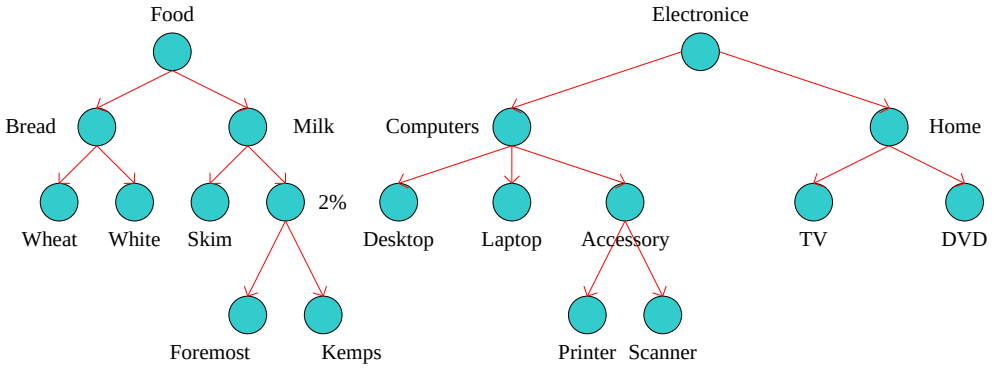

Figure 1. Binary representation

Data item set. The set of data items in the association rule is also called the data item set. If a certain set contains a total of k items, it is called the k-item set. When k is 0, it is a null item set. In any item in the item set Are a subset of this data set.

Data item set support. The total number of occurrences of a certain set X in the overall transaction set is called the total number of support for the set X of item sets and further the probability value is used to represent the total number of support items. Set the item set X support.

Association rules. For the two sets X and Y of disjoint sets in the data set of the whole transaction, the association rules between item sets are expressed by the expression X $\Rightarrow$ Y, X and Y are sets, and the Y item is expressed by the two indexes of rule support and rule reliability Intensity of set Y association rules.

Support degree can be expressed as:

$$D\sup(X) = \frac{\| X \|}{| T |} \quad (1)$$

Confidence is:

$$Dconf(X \Rightarrow Y) = \frac{\| X \cup Y \|}{\| X \|} \quad (2)$$

The purpose of association analysis is to find all strong association rules that are not less than the specified minimum support and minimum confidence constraints.

2.2. Introduction to improved association rule mining algorithm

The improved association rule mining method first uses the association rules to preprocess all the transaction data sets, eliminates the candidate subset of the non-frequent itemsets to reduce the data processing capacity; secondly, the database is scanned comprehensively, using the hash function, And other ways to deal with the affairs of the entire transaction tree pruning, greatly reducing the database scan time and improve the overall affairs of the frequent item sets set extraction speed, making the algorithm significantly improved. The specific implementation of the algorithm is as follows:

Produce frequent 2-itemsets. Use the hash function to scan the entire transaction database to generate frequent 2-itemsets.

Trim the database. By generating frequent 2-itemsets, the entire transaction database is trimmed, and other non-frequent item sets with non-frequent 2-itemsets are excluded, reducing the amount of data to be processed and saving data storage space.

Data packet records. According to the relationship between data and frequent 2-itemsets, the pruned data are respectively stored in the corresponding grouping data table for further processing.

Produce a candidate set of items. The search starts from frequent 2-itemsets. Frequent item sets are constructed through the combination of frequent item sets in adjacent layers, and the relationship tree is pruned by pruning, finally, all candidate item sets are obtained.

Produce frequent item sets. The degree of support for candidate item sets is calculated. If the support of a centralized packet list is greater than or equal to a certain threshold, the candidate item set is a frequent item set.

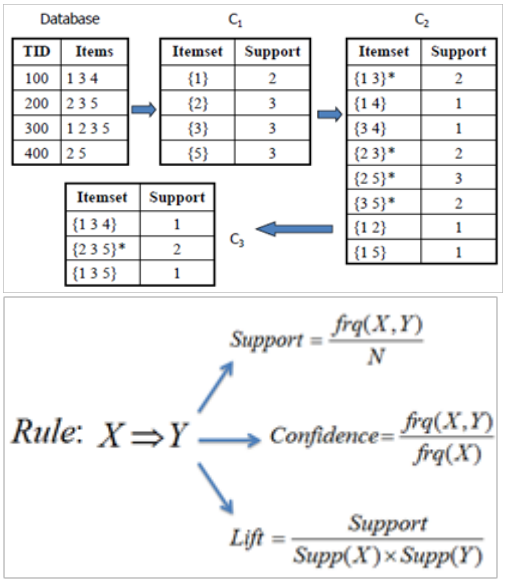

Figure 2. Association rule mining algorithm presentation

2.3. Teaching evaluation: the specific application

According to the specific design requirements of the improved association rules mining algorithm, the existing teaching evaluation data and the actual demand of each teaching subject are analyzed. Improved association rules algorithm mainly through the following three steps.

The first step of data pre-processing stage, through the collection of teaching evaluation data table pretreatment, the redundant field information is deleted, the teaching evaluation factor information table. For some non-normal evaluation of students, you can set the conditions for deletion, in order to avoid the impact of subsequent evaluation results.

The second step is to use the association rules algorithm to confirm the frequent item sets. Because some data in the data table will affect the result of mining, we need to deal with the relevant information that affects the quality of mining through the algorithm. For example: Familiar with the teaching material, content-rich, large amount of information and other similar evaluation information can be classified, set the minimum support, will repeat the evaluation records deleted, and finally through the algorithm to evaluate the information in the table continuously read and compare to find the required frequent item sets, improve the mining accuracy.

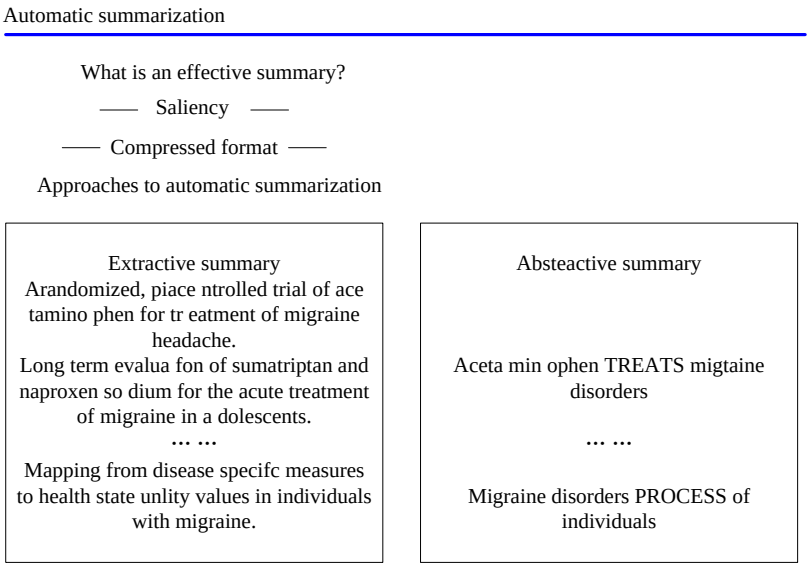

Figure 2. The finalized structure of the proposed methodology

The third step is to deduce the association rules, associate them with the set minimum confidence and frequent itemsets, and deduce and confirm the association rules that satisfy the required conditions.

2.4. Reform of physical education evaluation

For a long time since the founding of New China, the evaluation of PE teaching mostly uses quantitative evaluation and terminal evaluation, trying to simplify complicated teaching phenomenon into quantity and then deduce the result of a certain evaluation from the analysis and comparison of quantity Or pros and cons. The main function of PE teaching evaluation is sorting - to sort PE teachers, according to the evaluation results to measure PE teachers' work performance. Quantitative evaluation abandons the complexity of physical education evaluation itself, simplifies it to quantity, and presents it with grades, thus providing sports workers with a series of comparable and intuitive data, which can be used to reflect the teaching level of teachers , Label students, classify 369, etc., making the originally complex physical education process seem simple and easy. In fact, the teaching evaluation is for students to develop better and grow healthily. It is by no means to simplify the complicated physical education process and demonstrate its sorting function. This single way of thinking of "simplification theory" led to the sports scores that we strongly exclusion and disgust are still the only choices for evaluating students 'ability of motor learning and evaluating teachers' teaching ability. It is also this simplistic way of thinking that makes the differentiation of students' intelligence and career expectation more and more obvious. It becomes the biggest obstacle to pursuing people-oriented education and promoting quality education.

On the other hand, the evaluation of the PE teaching process has basically been formatted, that is, the so-called "formatted" teaching model is used to judge the quality of the teaching process. For example, the absence of a set of gymnastic exercises in gymnasiums seems to be unacceptable to sports assessors, and a set of innovative gymnastics has become a must in designing a perfect PE class. As for the basic gymnastics the role of teaching materials and the value of student development are often beyond the scope of evaluation. The evaluation of teaching results mainly examines the extent to which the result of teaching activities is in line with the intended teaching goal. The evaluation criterion at this time is the intended teaching goal, and the related value orientation issues are not considered in the evaluation activities. In fact, we should focus our evaluation on values.

Evaluation of PE Teaching in this way As the curriculum and evaluation are completed simultaneously, the information in teaching and student learning process cannot be fed back to the whole teaching evaluation system in a timely manner, teachers and students cannot be helped to timely adjust teaching methods and learning Method, which teaching evaluation methods can no longer meet the needs of modern vocational education. In the process of PE teaching evaluation in higher vocational schools, there is a lack of evaluation on the progress of students. Therefore, the following suggestions should be referred.

The correct guiding principle means that the teaching evaluation must adhere to the correct direction and make the teaching work better develop all-round talents through teaching evaluation. Therefore, the designers and users of teaching evaluation. First of all, it is necessary to correct the thought, to be consistent with the national education regulations, teaching plans with syllabus or curriculum standard spirit, to ensure the correctness of teaching evaluation guidance.

The new evaluation criteria should be conducive to students are understanding of sports and health, and to promote the comprehensive reform of physical education teaching and the monitoring of students' physical health. We should set up evaluation criteria suitable for different age and age groups with different physical quality, different sports skills and grasp lifelong sports methods. And face the individual differences, correctly reflect the degree of students' efforts and progress, reflect the standard of common and individual development, and respect the personality of the students.

Constructivism holds that the acquisition of knowledge by learners needs to go through the process of some autonomic construction of a subject. On the one hand, learners transcend the given information and derive more information through the interaction of the old and new knowledge, so as to enrich and enrich knowledge; on the other hand, when the new knowledge experience is assimilated into learners' original cognitive structure After the experience of the old knowledge should also be adjusted according to the specific circumstances, restructuring or mutation.

Physical education evaluation of the object includes both students, but also teachers. How to construct the content of PE teaching evaluation is not only the key issue of the current teaching evaluation theory discussion and research, but also the problem to be urgently solved in the teaching evaluation practice. As long as students master the motor skills, and in accordance with the linear accumulation of ways, you can automatically have the ability to participate in life-long sports, so as to achieve lifelong physical education. Under the influence of this concept of education, it is not surprising that we neglect the development of students 'personal feelings and charisma because of the single evaluation of PE teaching and the development of students' athletic skills and physical fitness. In fact, although sports technology teaching is one of the goals of physical education teaching.

From the perspective of fractal, the concept of "technical skills" education to train students to participate in the

capacity of life-long physical exercise, life-long physical process is virtually impossible to complete. We can think of the process of cultivating students 'ability of motor learning in school physical education as a simple one.

3. Conclusion

Digging hidden information in teaching evaluation data plays an important role in improving teachers' teaching ability, guiding college teaching reform and improving the strength of running a school. In this paper, the main disadvantages of the association rules algorithm, we propose an improved association rules algorithm. Using this algorithm can better solve the efficiency of teaching evaluation in colleges and universities, and has certain application value.

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