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Design of Management Learning System Based on SVM Algorithm

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Abstract. This article proposes innovatively using data mining technology, and using the "work evaluation quantification table" of the counselor as the basic database, and adopting the K-means algorithm to realize the relevant experience of ideological and political education for college counselor students. Certain reference.

Keywords: Ideology · Education management · K-means algorithm

This paper proposes the use of modern information technology and data mining to effectively mine the ideological and political education experience of counsellor students, and to use the Internet thinking to revise the ideological political work in universities.

1 Clustering Technology Mining Steps

Cluster analysis is an exploratory analysis. The characteristics of the group to which the case belongs are unknown. That is, before the cluster analysis, the researcher did not know how many categories the independent observation group could be divided into, and the characteristics of the category were not obtained. The essence of cluster analysis is to establish a classification method, which can automatically classify a batch of sample data according to their closeness in nature without prior knowledge. Cluster analysis of variables is similar to factor analysis. Both can be used to identify related groups of variables. The difference is that factor analysis considers the relationships between all variables at the same time when merging variables; while cluster analysis of variables uses a hierarchical discrimination method, clustering is performed sequentially according to the degree of affinity between individual variables.

There are two main cluster analysis methods, one is the "fast cluster analysis method" and the other is the "hierarchical cluster analysis method". If the number of observations is large or the file is very large (usually more than 200 observations), a fast cluster analysis method should be used. Because the number of observations is huge, the two discriminant graphs of the hierarchical clustering analysis are too scattered and difficult to interpret [1].

Step 1: Identify the objects of data mining. The goal of data mining must first be clarified, and this step is also the first step of data mining.

Step 2: Data collection. After clearly digging the objects, the most basic data collection is needed. And the student's ideological education work is not only through the counselor's "quantification of work evaluation form", but also includes the relevant questionnaire data.

Step 3: Preprocessing the data. When collecting data forms for student work, there is a big gap in the data format. Therefore, in this paper, ETL technology is used to transform the data set into a mathematical model that can be analyzed uniformly [1].

Step 4: Use the K-means algorithm to implement the division of the data object group.

Step 5: Analysis of clustering results. Through the analysis of the above mining, the mining results are obtained.

2   Key Data Mining Algorithms–K-Means

The so-called k-means algorithm refers to calculating the distance between different groups of objects, that is, the different objects in each cluster, and expressing it by means of average values, so as to obtain the centroid or the center of gravity of the cluster. The basic processing steps are: first select any K objects among them, and use them as the set k centers of gravity or centroids; second, on the basis of the above steps, calculate the remaining objects and the set K The distance of each object is divided into the shortest clusters of K objects according to the calculation result. Finally, the centroid or center of gravity of the new cluster formed is calculated by the steps of the above algorithm. The calculation of the above steps is repeated until the criterion function finally converges to minimize the objective function, thereby stopping the calculation. The criterion function usually uses the square error method, and its expression is:

$$E = \sum_{i=1}^{k} \sum_{p \in c_i} |p - m_i|^2$$

Where E represents the sum of the squared errors of all objects present in the space. P represents all points in the data set. M_0 is expressed as the centroid of c_i, and both p and m_i are multidimensional in this calculation.

These steps are as following:

Input: k: number of clusters
D: A data set containing n objects.
Output: a collection of k clusters.
method:
(1) Select k objects from D as the initial cluster center;
(2) repeat
(3) Assign each object (re) to the most similar cluster according to the mean of the objects in the cluster
(4) Update the cluster mean, that is, calculate the mean of the objects in each cluster;
(5) until no longer changes

Through continuous iteration and calculation, E reaches the minimum value. If E is the smallest, it indicates that the similarity between the two objects is higher. This also fully shows that the efficiency of the algorithm determines the size of the data required for the calculation.

3 The Specific Application of Cluster Analysis in Ideological and Political Education Management

3.1 Data Collection

This article selects a total of 50 quantified assessment forms for the work of our school's material and chemical school counselors. At the same time, the form mainly includes four aspects of attributes. It mainly includes:

First, management attitude. Management attitudes mainly include: clear rewards and punishments at work, and treat each student objectively; get along well with the student relationship; decent talk, be a good teacher; honest and self-discipline;

Second, management capabilities [2]. The so-called management ability is the ability to handle things in specific work, which mainly includes: strong organizational management ability in work, and effectively organize students to actively participate in school activities; accurately understand and grasp the situation of poor students, and do a good job Class work, study and student loans, etc.; work fairly and unselfishly to deal with students' violations of discipline; actively organize students to do good work of high praise; master the situation of the special student group in charge is more accurate and actively help students.

Third, management methods. The so-called management method is a method specifically used in student management. Mainly include: in-depth class or dormitory less than 3 times a week; insist on checking the health of the student dormitory once; the proportion of talking with students every semester is more than 30%; scholarships are issued in place, study, etc., and misunderstanding do a good job of guiding

students' thoughts; build QQ groups and open WeChat platforms to strengthen inter-action and communication with students.

3.2 Data Conversion

Through the problems in the above four aspects, the attribute values of the four dif-ferent attributes must be calculated first. Therefore, it is necessary to transform the data. The method of referring to ordinal variables for data conversion. The method is for those attributes that are difficult to evaluate objectively, we can only use the method of sorting and we take "outstanding, fine, qualified and poor" as the attribute values. Meanwhile, it is projected into the interval of [0, 1] by means of range mapping. The value is "1, 0.75, 0.5, 0.25, 0". Means of averaging different assessment targets at the same time. Such as management effect = (participation in class meetings + under-standing of the situation after class + student evaluation)/3.

3.3 Data Mining and Implementation

By cleaning and preprocessing the data, the specific data mining samples can be obtained as shown in Table 1.

Table 1. Data mining basic samples

Management attitude	Management ability	Management effect	Management methods
0.65	0.6	0.56	0.58
0.65	0.6	0.56	0.58
0.35	0.35	0.31	0.33
0.76	0.76	0.68	0.75
0.8	0.8	0.81	0.83
…	…	…	…

In response to the needs of data mining, this paper selects the first 3 of the 50 work assessment tables as the sample criteria for the data mining, and then divides the required data points into the nearest clusters by Euclidean distance. We take mean vector of the points in the every cluster as the new center point. The specific algorithm design is:

Suppose there is a data set: the purpose of which is to find k clusters. At the same time, K = 3 was taken in the study through analysis. Thus, the algorithm was pro-grammed by VC++:

Take the first 3 samples as the cluster center;

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While changes in clustering Ck do
Forming clusters;
for k = 1, ..., n do
Ck = {X belongs to D | D (Rk, x) ≦ D (Rj, x) for all j = 1, ..., k, j ≠ k}
end;
Regrouping new centers;
for k = 1, ..., n do
Ck = mean vector of points in Rk;
end;
end
```

3.4 Clustering Results Analysis

According to analysis these 50 different samples, the clustering results can be obtained as shown in Table 2.

Table 2. Analysis of clustering results

	Management attitude	Management ability	Management methods	Management effect	With sample number
Cluster 1 (good)	0.77	0.77	0.74	0.79	15
Cluster 2 (medium)	0.61	0.57	0.54	0.56	31
Cluster 3 (poor)	0.31	0.31	0.28	0.30	4

Cluster 1 Through the analysis of the data samples, 1 sample data is deducted, and 14 samples remain, so $14/50 = 28\%$; 1 sample is subtracted from cluster 2 (medium), then $30/50 = 60\%$; Three clusters (poor) are $3/50 = 6\%$.

Meanwhile, we consider the center of this data mining, the average score of the above four items is:

Management attitude = 0.77 * 0.28 + 0.61 * 0.6 + 0.31 * 0.06 = 0.6002
Management ability = 0.77 * 0.28 + 0.57 * 0.6 + 0.31 * 0.06 = 0.5762
Management method = 0.74 * 0.28 + 0.54 * 0.6 + 0.28 * 0.06 = 0.5480
Management effect = 0.79 * 0.28 + 0.56 * 0.6 + 0.30 * 0.06 = 0.5752

Therefore, through the above excavation, it can be concluded that in the ideological and political learning of students in the School, their scores exceeded 0.5 points, which belongs to the middle-to-high level. In the above attribute values, we can see that the

management attitude is 0.77, the value is the management attitude which has the largest impact on the work of the counselor, reaching 0.78. The score of the management method is the lowest among all the scores, indicating that the management method to a certain extent requires further adjustment of the materials and the faculty of the School of Chemical Engineering, such as insisting on chatting with more than 30% of students each semester, visiting more bedrooms, thereby deepening the relationship with the students, so as to better understand the students' thinking dynamics. At the same time, the paper innovatively adds instant messaging tools, for example, WeChat, MSN, making instant messaging tools to promote student and teacher interaction.

4   Conclusions

Under the new situation, students' political and ideological work is facing huge challenges. Therefore, timely adjustment of ideological eduaction and timely exchange of advanced experience can effectively promote the effect of ideological and political work in colleges. In this regard, this article attempts to use data mining. Through the analysis of clustering results, the information it mines has certain reference and reference value for student work.

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