Retraction

Retraction: Application of Clustering Algorithm in Ideological and Political Education in Colleges and Universities (J. Phys.: Conf. Ser. 1852 032041)

Published 24 January 2023

This article has been retracted by IOP Publishing following an allegation that this article may contain a nonsensical figure [2].

IOP Publishing has investigated in line with the COPE guidelines and have found the article contains a nonsensical figure which has no significant relevance to the text and agree this article should be retracted [1].

The authors neither agree/ disagree to this retraction.

[1] Qibin Wang 2021 J. Phys.: Conf. Ser. 1852 032041
[2] https://pubpeer.com/publications/5D7C63FC527FC6B3313524D1DC2DE8

Retraction published: 24 January 2023
Application of Clustering Algorithm in Ideological and Political Education in Colleges and Universities

Qibin Wang¹,*
¹Nanchang Institute of Science and Technology, Jiangxi, 330108
*Corresponding author email: wangqibin@nut.edu.cn

Abstract. In recent years, with the rapid development of information technology, China has entered the information age. Information technology has changed our life, but also affected the form of ideological and political education (IAPE) management in colleges and universities (CAU). Data mining technology based on clustering algorithm has been widely used in university education management, but the application research of this technology in the field of IAPE is still insufficient. Therefore, this paper puts forward the application research of clustering algorithm in IAPE in CAU. After research, this paper believes that the existing IAPE in CAU is still based on the traditional management mode, lack of data sensitivity and insufficient utilization of teaching information data. In view of this situation, according to the education and management needs of IAPE, combined with the characteristics of clustering algorithm, the traditional clustering algorithm is optimized and improved. Compared with the traditional algorithm, the improved algorithm simplifies the calculation steps, improves the accuracy of calculation, and is more suitable for the application in the field of IAPE in CAU. In order to further verify the actual effect of this algorithm, the improved clustering algorithm is verified by experiments. In this experiment, the proportion of the three types of fraction is 25%, 64.4%, 10.6%, which is much higher than the previous sample data. Analysis shows that the algorithm in this paper has played a positive role in improving the management effect of IAPE in CAU and promoting the optimization and reform of IAPE in China.

Keywords: Clustering Algorithm, Data Mining, Ideological and Political Education, Education Management

1. Introduction

Today's society is in the era of rapid development of information, people's communication is more and more close, life is more and more convenient, and work is more and more efficient. Information technology has changed the way of human life, big data is usually associated with cloud computing [1-3]. Real time big data analysis needs tens of thousands of computers working together to transform, integrate and analyze massive data, which can discover new knowledge and create new value. Big data technology has been widely used in biology, physics and other disciplines, and its advantages are...
increasingly prominent in transportation, finance, communication and other industries \cite{4-5}.

The data revolution is not just a revolution in information technology. Like the invention of the Internet and new media technology, big data technology is a force leading scientific and technological innovation, capacity adjustment and social change. It is not only an indispensable means and means for the government, enterprises and organizations to optimize management, but also a new direction of personal development \cite{6-7}. CAU are the main battlefield for the inheritance and development of social culture. Teaching methods, management and service modes, as well as teachers' thinking mode, learning mode and behavior practice, will be deeply affected by big data. How to deal with the challenges of the era of big data, how to use big data technology to open up a new path of IAPE, and improve the accuracy and effectiveness of IAPE, has become an important research topic of China's Higher Education \cite{8-10}.

This paper deeply studies the application of clustering algorithm in the field of IAPE in CAU, and understands that in the actual IAPE management of CAU, the application of data mining technology for information management is not high. This is mainly due to the lack of data value concept, the low utilization rate of information data, and the lack of applied data analysis means. As a result, the effect of IAPE is not ideal, which seriously affects the development of IAPE in China. Therefore, this paper puts forward the application research of clustering algorithm in IAPE in CAU, hoping to improve the application degree of this kind of algorithm in IAPE in CAU through the optimization and improvement of traditional clustering algorithm, so as to promote the modernization process of IAPE and management in China. In view of the existing problems, this paper gives specific optimization and improvement scheme, including optimization of algorithm structure, simplification of calculation steps and other operations, so as to make it more in line with the practical needs of IAPE in CAU. In the experimental test, the effectiveness of the algorithm is further verified. Analysis shows that after the optimization and improvement of this paper, the clustering algorithm can be better applied in the IAPE in CAU, which plays a role in promoting the development of this field.

2. Clustering Algorithm and IAPE in CAU

2.1. IAPE in CAU

IAPE in CAU refers to the systematic influence on the ideological and political educators in the process of education. The purpose is clear, the way of planning and organizing is based on the needs of the country and society, and to transform a certain social ideological and moral quality into an individual's ideological consciousness and moral quality. The content of IAPE in CAU mainly includes world outlook education, political education, legal education, etc. We should guide students to correctly understand the current international and domestic social background, understand the world development trend, and grasp the characteristics of socialist development. This is the new era of contemporary college students put forward the requirements, should combine personal ideals with national development, strive to achieve socialist modernization with Chinese characteristics, as well as the great rejuvenation of the Chinese nation.

2.2. Main Characteristics of IAPE in CAU

(1) Directionality

The characteristics of IAPE in CAU are that the IAPE in CAU should follow the socialist ideology, follow the socialist direction, and provide the value guidance and spiritual power for the all-round development of the education objects by clarifying the ideological consciousness, values and moral standards.

(2) Purpose

The main purpose of IAPE in CAU is to serve the purpose and task of education. According to the needs of national and social development, the IAPE in CAU should take the cultivation of talents as its responsibility, continuously improve the ideological and political and moral quality education object, and then promote its all-round development.
(3) Practicability
The characteristics of practice are mainly reflected in the basic requirements of IAPE in universities. It is a basic requirement of IAPE to guide students to combine theory with practice, actively apply it to practical work and guide students to develop more in social work. From this point of view, the IAPE in CAU is very practical.

(4) Social relevance
The social relevance is mainly reflected in the fact that CAU are the places where the society trains and transports talents. CAU can improve the quality of students through IAPE, and provide higher quality talents for the society. In the face of an open society, IAPE in CAU can also feed back the quality of social personnel training, so as to enhance the effectiveness of IAPE in CAU.

2.3. Introduction of Clustering Method
Clustering is a process of dividing a data set into groups or clusters composed of several similar objects, which can maximize the similarity between objects in the same group and reduce the similarity between objects in different groups. Clustering analysis is generally based on the spatial "distance" of data objects to measure the "similarity" between objects. Clustering methods include partition method, hierarchical method, density method, etc. Hierarchical clustering method is to divide the data into several groups to form the corresponding clustering tree, which can be divided into two hierarchical clustering methods: top-down and bottom-up. First of all, cluster all the objects into a certain clustering condition, and then construct a clustering method from the bottom to the bottom.

2.4. Decision Tree Algorithm Based on Fuzzy Clustering
The information gain degree of information gain attribute is the expected value of entropy reduction after attribute segmentation:

\[
\text{Gain}(S, A) = \text{Entropy}(S) - \sum_{S_i \in \text{split}(S)} \frac{|S_i|}{|S|} \text{Entropy}(S_i) \in S
\]

The calculation steps are as follows:
1) The original matrix is obtained as follows:
\[
X = \begin{bmatrix}
X_{11} & X_{12} & \cdots & X_{1n} \\
X_{21} & X_{22} & \cdots & X_{2n} \\
\vdots & \vdots & \ddots & \vdots \\
X_{m1} & X_{m2} & \cdots & X_{mn}
\end{bmatrix}
\]

\[
X = \begin{bmatrix}
X_{11} & X_{12} & \cdots & X_{1n} \\
X_{21} & X_{22} & \cdots & X_{2n} \\
\vdots & \vdots & \ddots & \vdots \\
X_{m1} & X_{m2} & \cdots & X_{mn}
\end{bmatrix}
\]  

(2)

2) Fuzzy clustering based on fuzzy similarity relation firstly establishes fuzzy similarity matrix, and similarity coefficient reflects the similarity degree of samples relative to some attributes.
3) The transitive closure matrix \( t(M_w) \) is obtained. Let \( w_i = 1 \) be obtained, and now \( w_i \) is:
\[
w_i = \left( a_i^{(i)} \right)
\]

\[
w_i = \left( a_i^{(i)} \right)
\]  

(3)

4) According to \( w_i \), write the transitive closure \( t(R) \) of fuzzy relation \( R \), and the algorithm ends.
5) In the same cluster, the information gain degree is calculated according to different attributes. When the sample set is divided into subsets by attributes, the entropy value of the system is the minimum.

3. Experimental Scheme Design
(1) Data mining objects
Collect and sort out one evaluation form of IAPE in CAU in 2019, sort out 150 quantitative evaluation forms related to IAPE management, and put forward relevant problems. Through the data mining of these data, some important conclusions are drawn, which have unprecedented guiding value for the management and teaching of IAPE in CAU.

(2) Data acquisition
Collect the evaluation form of IAPE in 2019 from the student affairs office.

(3) Data preprocessing

Data preprocessing is a very important link in the process of data mining. Due to the existence of noise data, missing data and inconsistent data in the actual data, it is necessary to process the data with interference to improve the data quality. There are many methods of data preprocessing, including data integration, data cleaning and so on. Before applying this data processing technology to data mining, it can greatly improve the quality of data mining results and reduce the time needed for mining. The main task of data cleaning is to fill in the missing data values. Some necessary attributes are missing values, which can be filled with data cleaning technology. Because the data used in this study is decimal notation, and the amount of data is not very large, so there is no need for data conversion and data reduction.

4. Discussion

4.1. Result Analysis

In this paper, the k-means algorithm is used to analyze 150 sample data. Among them, three standard samples are good, medium and poor, and 147 samples are from job evaluation scale and data conversion. All sample data contain four attributes: management attitude, management ability, and management method and management effect. The initial K value is set to 3. The final mining results are shown in Table 1 and Figure 1.

| Management attitude | Management ability | Management measures | Management effect | Including the number of samples |
|---------------------|--------------------|---------------------|-------------------|---------------------------------|
| Preferably          | 0.75               | 0.78                | 0.76              | 0.79                            | 56                              |
| Secondary           | 0.62               | 0.55                | 0.56              | 0.57                            | 79                              |
| Poor                | 0.33               | 0.32                | 0.29              | 0.25                            | 15                              |

Figure 1. Cluster result analysis

According to the results of Table 1 and Figure 1, the distribution range of the final data samples...
included in each cluster is as follows: good, 56 data samples, excluding standard samples, accounting for 36.7%; moderate, 79 samples, excluding standard samples, accounting for 52%; poor, a total of 15 samples, excluding standard samples, accounting for 9.3%. In order to further verify the final results of data mining, this paper obtained the comprehensive quantitative scores of 268 students of Computer College in 10 IAPE activities in the past 2019 from the student affairs office. The total score is 100 points, and then we classify these data samples according to the standard of 0-100 points, which are divided into three levels: above 80 points, 80-60 points and below 60 points. The result of the last partition is shown in Figure 2.

Figure 2. Comparison of comprehensive quantitative score analysis results

It can be seen from the analysis results in Figure 2 that the proportion of branches in each level is higher than that used in cluster rating. According to the above analysis, the proportion of the three types of scoring parts are 25%, 64.4% and 10.6%, which is basically consistent with the proportion of the three types of evaluation samples. Practice has proved that the analysis model based on clustering algorithm is a very successful model, which has certain reference and guiding significance for the management and teaching of IAPE in CAU.

4.2. Cultivate Data Value Concept
The concept of data value is to realize the huge value contained in the data. Only when big data is fully developed can the value of data be brought into full play. At present, the understanding of data value is far from enough, the development of data is also insufficient, and the value of data has not been fully utilized. China is the country with the largest population in the world and will become the country with the largest amount of data. However, we do not pay enough attention to the preservation of data, and the utilization rate of stored data is not high. Therefore, in the era of big data, IAPE in CAU should establish the value of data and fully tap the value of data. The role of big data in promoting the scientific and accurate evaluation of IAPE in CAU is mainly reflected in: promoting the scientific nature and accuracy of IAPE. The traditional IAPE in CAU is based on the feelings of teachers, the experience and observation judgment of educators, and the emotion of educators. In the era of big data,
the IAPE in CAU is based on big data, which plays a positive role in the science and accuracy of IAPE in CAU.

5. Conclusions
Clustering algorithm is the most widely used data mining technology. In recent years, the unique advantages of clustering algorithm have a great impact on the teaching and management of IAPE in CAU in China. In view of the shortcomings of the existing clustering algorithm in the field of IAPE, this paper puts forward the way to optimize and improve the traditional clustering algorithm, which can better make up for the shortcomings in this respect, and improve the existing management mode of IAPE in CAU. Analysis shows that data mining technology can maximize the use of data, the use of clustering algorithm for the scientific management of IAPE in CAU is one of the key works in the reform of modern education, but also a development trend in the future.

References
[1] Wenhao, WU, & Sheng, WU. (2015). Application of density-based clustering algorithm in crime cases analysis considering multiple time scale. Journal of Geo-Information Science, 17 (7), 837-845.
[2] Ding Yonghong. (2016). Data stream privacy protection algorithm based on clustering analysis. Journal of Chongqing Three Gorges University, 032 (003), 33-37.
[3] Shi, K. (2017). Research on the network information security evaluation model and algorithm based on grey relational clustering analysis. Revista de la Facultad de Ingenieria, 14(1), 69-73.
[4] Feizollah, A., Anuar, N. B., & Salleh, R. (2018). Evaluation of network traffic analysis using fuzzy c-means clustering algorithm in mobile malware detection. Journal of Computational and Theoretical Nanoence, 24(2), 929-932.
[5] Huawei, Y. I., Zaiseng, N., Fuzhi, Z., Xiaohui, L. I., & Yajun, W. (2018). Robust recommendation algorithm based on kernel principal component analysis and fuzzy c-means clustering. Wuhan University Journal of Natural ences, 23(002), 111-119.
[6] Jia, C., & Dan, L. (2016). On ways to infiltrate ecological civilization education into IAPE of higher vocational colleges. science education article collects, 56(4), 337-341.
[7] Zhang, Y. (2015). Study on implicit IAPE theory and reform in higher vocational colleges. Creative Education, 06(5), 1229-1232.
[8] Meng Qi, Zhang Yajun, & Ge Mengwei. (2016). Thoughts on promoting IAPE and humanistic education in higher vocational colleges from perspective of moral education% Thoughts on Education and Humanities Education. Journal of Yangling Vocational and Technical College , 015 (003), 76-79.
[9] Xu, W., Zhou, H., Cheng, N., Lyu, F., Shi, W., & Chen, J., et al. (2018). Internet of vehicles in big data era. IEEE/CAA Journal of Automatica Sinica, 5(1), 19-35.
[10] Li, C., Hu, Y., Liu, L., Gu, J., Song, M., & Liang, X., et al. (2015). Towards sustainable in-situ server systems in the big data era. Acm Sigarch Computer Architecture News, 43(3), 14-26.