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University Education Model and its Value of Cultivating Students in the Perspective of Education Considering Association Rules Algorithm

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ABSTRACT

In today's higher education institutions, the development of "big ideology" has become essential. From a macro perspective, integrating "big ideology" into the classroom allows for better utilization of course resources and improves the classroom atmosphere. It also makes the curriculum more relevant to students' daily needs, thereby better cultivating their moral qualities. Therefore, this study explicitly analyses the university education model of nurturing students from the ideological and political education perspective, considering the association rules algorithm and its value. The study optimizes the association rules algorithm, drawing inspiration from the harmony search algorithm's main ideas, and introduces the concept of "self-learning" for students' improvement, thereby enhancing the overall search capability of the group and delving into the deficiencies in the analysis of students' existing course grades. The study proposes an association rules algorithm with self-learning capabilities, and the optimized performance of the association rules algorithm surpasses that of the function algorithm. The comparative results indicate that the optimization can achieve the ideal optimal solution of the reference function, and the proposed optimization significantly improves the computational performance of the rules algorithm. The algorithm's advantage increases considerably from 1000 rounds, and the network's lifetime extends to 1600 rounds. Through testing, it is found that applying association rules mining technology to analyze students' academic performance helps identify the relationship between course settings and course grades on the platform network, contributing to discovering essential information hidden in the network. Universities should actively explore the model of ideological and political education in practice and cultivate students, construct a "dual-platform and four-linkage" practical education model considering the association rules algorithm under the perspective of "big ideology," fully exert the value of ideological and political education in practice, and promote effective reform and progress of ideological and political education in universities.

Keywords: Big Ideology, Association Rules Algorithm, Ideological and Political Education, Practical Education Model

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1. Introduction

With the development of society, people are increasingly aware of the importance of ideological and political education [1]. Therefore, universities should actively promote innovation and develop more targeted and effective methods of ideological and political teaching to meet the needs of social development better. The association rules algorithm is a widely used technology in data mining and knowledge discovery, capable of extracting useful information and knowledge from a large amount of data to support decision-making and prediction. The primary objective of the association rules algorithm is to find relationships between different variables in a dataset, often representing items, services, or web pages, and discovering association rules among them [2]. In the context of higher education's ideological and political education practice, the application of the association rules algorithm is still in the exploratory stage but has already shown significant value. Firstly, the association rules algorithm can help students better understand and master ideological and political theoretical knowledge. In traditional ideological and political education, theoretical knowledge is often passively imparted to students, lacking active thinking and exploration. The association rules algorithm can analyze students' learning behaviors, interests, knowledge structures, and provide personalized learning plans and resource recommendations, thereby stimulating students' interest and initiative in learning and improving learning effectiveness. Secondly, the association rules algorithm can promote innovation and reform in the university's ideological and political education model [3]. Traditional ideological and political education methods often focus on teachers' role and overlook students' personalized needs. The association rules algorithm can help teachers better understand students' learning needs and characteristics, formulate more scientific and targeted teaching plans, and enhance teaching effectiveness and quality. Finally, the association rules algorithm can enhance the practical education effect of ideological and political education in universities. Ideological and political education is not just about imparting theoretical knowledge; it is a process of practical education. By applying the association rules algorithm, we can not only gain insight into students' thinking patterns and behaviors but also provide them with rich practical experience to cultivate their spirit, skills, and consciousness of innovation, leading to comprehensive development. The university education model of cultivating students in the perspective of "big ideology" considering the association rules algorithm has significant research significance [4]. This model can promote the digital transformation and innovative development of ideological and political education in universities. In the era of information technology, digital transformation has become a crucial direction for educational reform in universities.

2. Related Work

By conducting in-depth ideological and political education, it is possible to enhance students' moral character and motivate them to better integrate into social life, thereby creating a healthier and more positive learning environment, promoting students' growth and success, and contributing to their healthy development and personal qualities. Currently, colleges actively promote the cultivation of college students' ideological and moral qualities, actively expand their learning horizons and cultivate their sense of social responsibility. Colleges have opened some professional student training courses and recruited many outstanding students, all of which will greatly change students' learning environment, promote students' sense of social responsibility, and enhance

their sense of social fairness. At the same time, data acquisition and utilization are also crucial. In the field of ideological and political education in universities, previous research has been conducted. These works aim to explore and summarize the development trends, issues, and solutions of ideological and political education in universities, providing references and references for subsequent research and practice. Zhou et al., through a practical education model, can help students better understand and master ideological and political theoretical knowledge, promote innovation and reform in ideological and political education models, and improve the practical education effect of ideological and political education in universities [5]. Xia research indicates that personalized learning can better meet students' individual needs and learning interests. Through the analysis and prediction of the association rules algorithm, we can better understand students' ideological dynamics and behavioral characteristics, provide more personalized learning plans and resource recommendations for students, and improve the effectiveness and influence of ideological and political education [6]. Wu et al.'s research shows that under the framework of "big ideology," universities should pay more attention to practical education to cultivate students' practical skills and comprehensive qualities to achieve better educational results [7]. At the same time, previous research has also explored how to apply the association rules algorithm to ideological and political education in universities from the "big ideology" perspective to improve the targeted and effective educational outcomes. Shen et al.'s research shows that by analysing and predicting the association rules algorithm, we can better understand students' needs and interests, provide more personalized learning plans and resource recommendations for students, and improve learning effectiveness and comprehensive qualities [8]. With the development of big data technology, the application of association rules algorithm in big data analysis has become increasingly widespread. Wang, through the analysis and prediction of the association rules algorithm, can accurately predict and analyze the ideological dynamics and behavioural characteristics of college students, providing an essential reference basis for ideological and political education in universities [9]. Personalized learning is also a hot topic in the current education field. By applying the association rules algorithm, Zhang et al. can tailor learning plans for each student and provide targeted resource recommendations, thereby significantly improving students' learning performance and comprehensive abilities [10]. The practical education model is a significant development direction of ideological and political education in universities. The analysis and prediction of the association rules algorithm can provide essential support and reference for the practical education model, thereby improving the effectiveness and quality of practical education. In summary, previous work has been done in the fields of ideological and political education in universities and the application of the association rules algorithm. These works provide important references and references for subsequent research and practice.

3. Model Construction Based on Association Rules Algorithm

3.1 Information Collection

The advent of the big data era will inevitably lead to changes in the education process. For example, in the era of big data, learners utilize networks for learning, and educators can use association rules algorithm to extract and compare students' learning situations, explore the structure of defective behaviors, find factors and rules, and obtain information about students' learning outcomes. Whether data can be successfully obtained and how to utilize the IPE's (Information Processing and Exchange) role need to be tested in practice. Information theory, or communication statistics theory, is a theoretical system developed to solve transmission process problems. The information transmission system is the sender, receiver, and the channel connecting them. In theory, post-uncertainty should never be greater than a priori uncertainty and can never be lower. Information can only reflect the uncertainty of symbols, as shown in Formula 1, which is used to calculate the value of entropy. Here,

$P(a_i)$ represents the probability of X taking various possible values a , $a...,a_r$ while $I(a_i)$ is the amount of information obtained when the event X equals a_i. The amount of information is usually represented by the negative logarithm function, i.e., $I(a_i) = -log(P(a_i))$. The formula adds the average information of various values, $P(a_i) * I(a_i)$, to obtain the entropy of the random variable X, which measures the uncertainty or information contained in X. When the entropy reaches its maximum value, it indicates that the random variable X is the most uncertain.

$$H(X) = P(a_1)I(a_1) + P(a_2)I(a_2) + \cdots + P(a_r)I(a_r) \qquad (1)$$

As shown in Formula 2, it describes the entropy of the quotient of two random variables X and Y (i.e., X divided by Y). It represents the degree of uncertainty or information contained in the quotient of the two random variables. In the formula, the double summation is used to consider all possible quotient values. The information of each quotient value equals its probability multiplied by its corresponding natural logarithm.

$$H\left(\frac{X}{Y}\right) = -\sum_{i=1}^{r}\sum_{j=1}^{s} p\left(\frac{a_i}{b_j}\right)\log p\left(\frac{a_i}{b_j}\right) \qquad (2)$$

3.2 Intelligent Data Mining Module Construction

Data mining (DM) is mainly used for assessment, including evaluating educational software, learning processes, teachers, students, and the learning environment. The database stores different teaching resources, such as domain knowledge base, student information base in the student model, cognitive state base, and learning history base. The DM module is a key component in building an intelligent distance learning environment, mainly analyzing the data in the student information base and providing discovered patterns and rules to the knowledge base. This module primarily consists of four parts: preprocessing module, algorithm module, display module, and feedback module. A statistical technique called Bayesian classification can predict the likelihood of a given sample belonging to a specific category. Its performance is comparable to neural networks and decision trees in some fields. Bayesian theorem forms the foundation of Bayesian classification. It assumes that the probability of a sample belonging to class Ci is greater than that of belonging to other classes. The formula for Bayesian theorem is given by Formula 3.

$$P(C_i|\ X) = \frac{P(X|\ C_i)P(C_i)}{P(X)} \qquad (3)$$

3.3 Optimization of the Association Rules Algorithm

The application of DM in student course performance analysis mainly analyses the shortcomings of existing course performance analysis. It applies association rules mining technology to student performance analysis, aiming to determine the relationship between course settings on the platform network and course performance, and discover important information hidden in the network. Therefore, the transformation of IPE thinking in the big data era mainly targets the overall changes of students and makes specific adjustments to individual education. This association rules algorithm performs well in solving simple low-dimensional problems, with fast solving speed, high accuracy, and good global searchability. However, its global searchability is poor when solving relatively complex multi-modal problems and may easily fall into local optimization. To address these algorithm limitations, this paper proposes an association rules algorithm with self-learning capabilities. The algorithm draws inspiration from the main ideas of harmony search algorithm. It introduces the concept of “self-learning” for students’ improvement, thereby enhancing the overall search ability of the group. The optimized algorithm’s flowchart is shown in Figure 1.

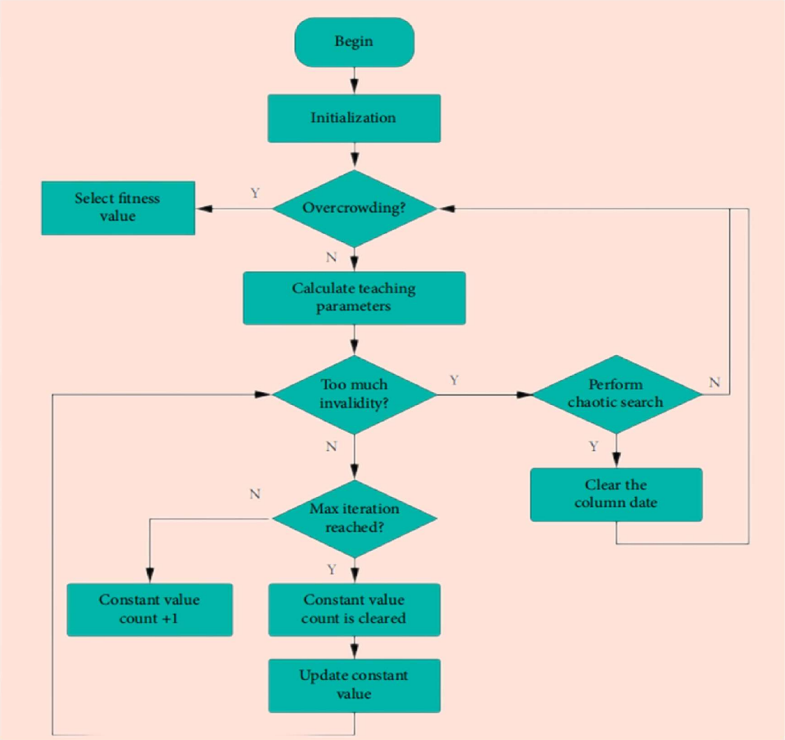

Figure 1. Flowchart of the optimized association rules algorithm

4. Experimental Design and Analysis

4.1 Experimental Design

Under the guidance of "big ideology," we should closely integrate ideological and political courses with practical work and implement the fundamental task of fostering virtues and nurturing talents. We call on subject teachers to explore the nurturing content and elements in the courses, fully leverage the significant role of ideological and political courses, promote the construction of ideological and political theory courses in various disciplines, and promote the collaborative development of ideological and political courses with multiple disciplines. "Four-Linkage" "Practical Education" is a long-term task aimed at continuously strengthening the content of "Four-Linkage" to serve social development better. In this process, we need to incorporate "Four-Linkage" and "Practical Education" into our courses and strengthen its management to assist our students' growth better. We also need to make our "Four-Linkage" a diverse and vibrant community. To better promote ideological and moral construction, we recommend enriching the courses through online and offline education. We also suggest using modern technologies, such as electronic media, to provide more support for our courses. We propose establishing interdisciplinary communication channels to make our courses more flexible and diverse. In conclusion, we hope that through these measures, we can better promote our ideological and moral construction and contribute more to society. By re-examining and improving the course arrangements and re-evaluating and reviewing students' grades, we can encourage the reform of ideological and moral education and construct a new "big ideology." Based on the new era of the network society, we introduce the concept of data-driven as an integrated concept to explore the data-driven teaching and education model in universities to enhance the effectiveness of university ideological and political education. In the era of big data, we constantly explore new teaching models and apply them to practical problems. We analyze the components of the educational model to explore how to remain competitive in this era and propose specific strategies to address these challenges.

4.2 Experimental Results Analysis

In the past, the focus of ideological and moral construction in higher education was mainly on theoretical teaching, and teachers could only rely on the knowledge points in textbooks, with limited learning opportunities. However, with the development of the times, higher education is striving to promote diversified ideological and moral construction, not limited to teaching theories but also closely integrating them with economic and social issues, fully utilizing diverse social resources to enhance learning effectiveness. In this university, we find that the content of ideological and political courses is extensive, not only covering basic theories but also various practical operations and cultivation methods. For example, we can enhance our qualities by participating in various community activities that foster individuality, campus cultural and sports projects, and public service projects. Through these methods, we can cultivate outstanding ideological and political leaders for our future. In today's era of globalization, we must closely integrate theoretical learning, social internships, and students' daily operations to fully leverage the role of ideological and political courses and enhance students' qualities. This work replicates two common real-world constrained optimization problems to test the performance of the proposed association rules algorithm.

The final criterion for the algorithm in the experiment is its maximum number of iterations, and all algorithms have a maximum of 100 iterations. Figure 2 shows the statistical average of the solutions obtained by running 20 10 dimensional benchmark functions independently through different optimization algorithms 60 times. Compared with other algorithms, the optimization performance of the association rule algorithm optimized by Test Function is better than that of the function algorithm. The comparison results indicate that optimization can achieve the ideal optimal solution of the reference function. The proposed optimization significantly improves the computational performance of the rule algorithm. The traditional learning algorithm can not meet the system's requirements for recognition accuracy and Rate of convergence. With the rapid development and wide application of intelligent computing methods, people actively seek to use intelligent computing methods to determine the model structure and model parameters of nonlinear systems so as to improve the performance of System identification.

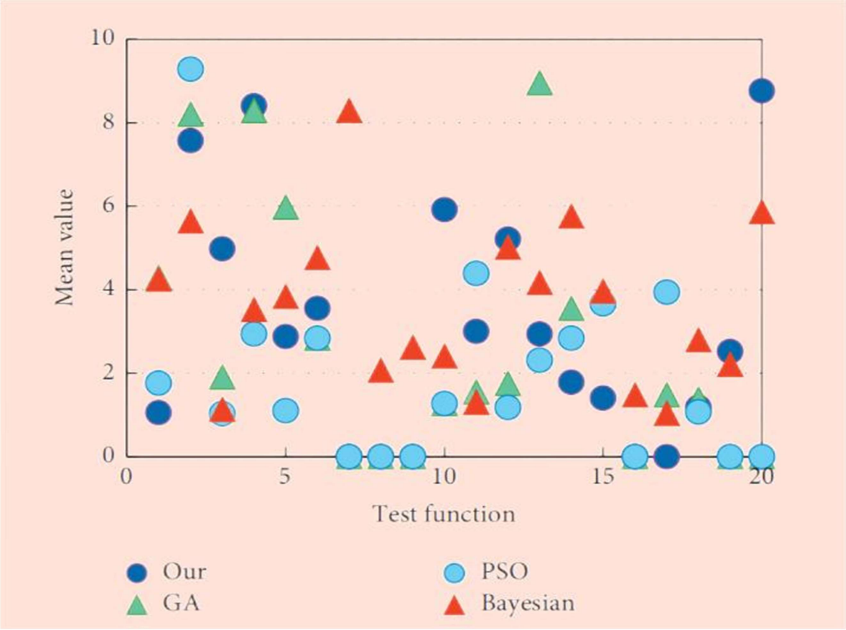

Figure 2. Comparison of Optimization Results for Test Functions

For four real-world datasets, this section compares the algorithm with single-objective optimization techniques. The experimental results of modularization mean are shown in Figure 3. It can be seen that the modularization mean of Our significantly surpasses GA, Bayesian, and PSO algorithms, with the highest average modularization value being 0.5238. This indicates that in the dolphin network, the algorithm has the best optimization effect and a stronger network community structure. The average values for GA, PSO, and Bayesian algorithms are 0.4003, 0.3122, and 0.3122, respectively, and the optimization results are noticeably inferior to the rule algorithm. In the proposed association rules algorithm, the characteristics of community networks are considered, and population initialization and neighborhood search methods are used to maintain population diversity. GA and PSO algorithms cannot maintain detection coverage. The association rules algorithm can keep 100% coverage at 300 rounds. Between 400 and 900 rounds, the association rules algorithm and Bayesian results are similar, but the Bayesian algorithm has a coverage rate of 1.900% at 70 rounds. The advantage of our algorithm significantly improves from 1000 rounds, extending the network life to 1600 rounds. The test shows that applying association rules mining technology to student performance analysis, determining the relationship between course settings and performance on the platform network, helps discover important information hidden in the network. This can lead to specific adjustments for individual education while focusing on the overall changes of students in the IPE thinking era

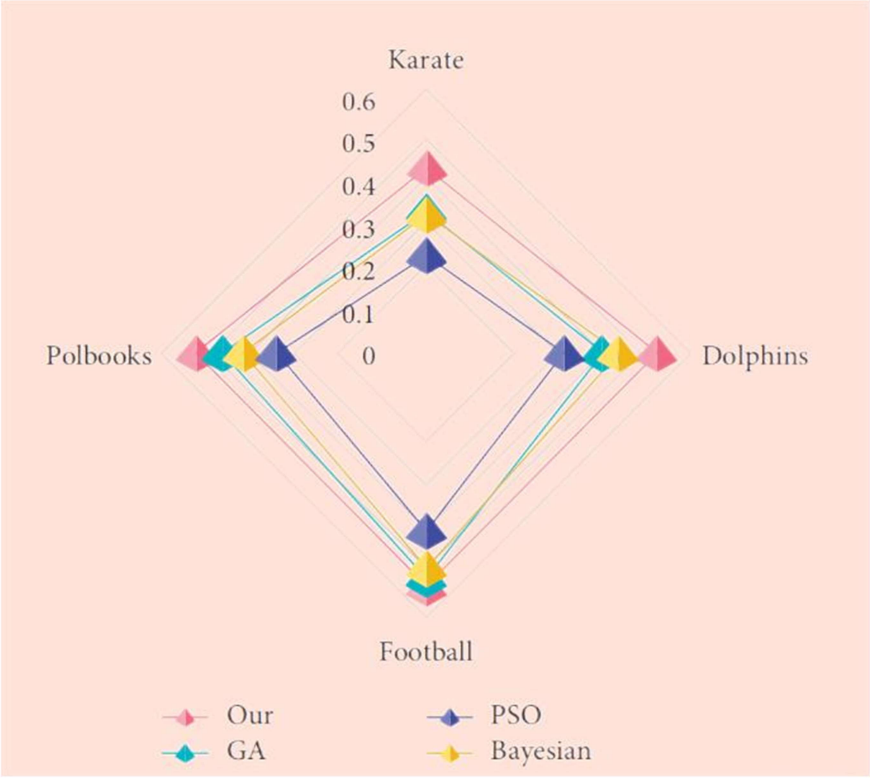

Figure 3. Modularization Values Obtained in the Actual Network

5. Conclusions

Combining ideological and political theory with practical applications and establishing a practical education system for ideological and political education can improve the quality of ideological and political teaching. The deep integration of ideological and political theory with practical applications is promoted, making full use of

the cultivation role of theoretical courses and enhancing the depth and breadth of ideological and political theory. Through the "dual-platform four-linkage" practical education model, universities should prioritize improving students' qualities and create a vibrant and integrated environment, cultivating outstanding citizens with innovative spirit and good professional ethics. By introducing the association rules algorithm into university ideological and political education, digital transformation and innovative education development can be better achieved, raising modern education and the quality of talent cultivation. This model can also provide crucial technical support and practical experience for realising practical education in university ideological and political education. In conclusion, the practice-oriented education model in university ideological and political education, considering the association rules algorithm from a big ideology's perspective, has significant practical value and application prospects. It can promote the digital transformation and innovative development of university ideological and political education, meet students' personalized needs and learning interests, improve the targeted and practical nature of ideological and political education, and provide essential technical support and practical experience for the realization of practical education in university ideological and political education. Therefore, further research in this field is worthy of exploration and study.

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