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Retraction

Retracted: The Construction of a Prediction Model for the Teaching Effect of Two Courses Education in Colleges and Universities Based on Machine Learning Algorithms

Wireless Communications and Mobile Computing

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope

(2) Discrepancies in the description of the research reported

(3) Discrepancies between the availability of data and the research described

(4) Inappropriate citations

(5) Incoherent, meaningless and/or irrelevant content included in the article

(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] C. Pei, "The Construction of a Prediction Model for the Teaching Effect of Two Courses Education in Colleges and Universities Based on Machine Learning Algorithms," *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 1167454, 9 pages, 2022.

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Research Article

The Construction of a Prediction Model for the Teaching Effect of Two Courses Education in Colleges and Universities Based on Machine Learning Algorithms

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In this era of machine learning being applied to various fields, its use in college Two courses education has gradually become the next outlet. The reform and innovation based on machine learning is an upgrade that must be carried out in Two courses education. In this experiment, the purpose of predicting the effect of Two courses classroom teaching is achieved by rationally using the Apriori algorithm in the machine learning algorithm to construct a prediction model. After modeling and verification, it has been shown the prediction model of Two courses classroom and extracurricular teaching effect using the machine. Apriori algorithm technology can enhance the participation and interaction of Two courses education, stimulate the interest of college students in Two courses education, and improve their enthusiasm. The selection and basic information of Apriori algorithm and the prediction for practical application have been studied. The accuracy of the prediction model is investigated. Compared with the logistic regression algorithm, it is concluded that the model established by the Apriori algorithm selected in this experiment has higher accuracy. Finally, the prediction model is organically integrated into the Two courses of a university carefully selected by the experiment. After a semester of intensive use, and then algorithm effects, the difference in accuracy is no more than 2%, far better than the expected 6%.

1. Introduction

Ideological education includes the study and understanding of different philosophical systems and the understanding of the origin, development, main viewpoints, and limitations of the main philosophical schools. Ideological education, in a broad sense, refers to the education that affects people's thoughts and views in all aspects and in a narrow sense refers to the education that forms a certain world outlook and outlook on life. It is a part of school moral education. This education is carried out from the following aspects: to enable students to master the concepts of outlook on life and world outlook and their related systematic knowledge; on the basis of mastering knowledge, gain experience and experience through practice, and turn it into views and beliefs; and under the guidance of certain views and beliefs, guide students to form specific life attitudes and ideals in real life. Political education plays a role in cultivating college stu-

dents' opinion on life, values, and world opinion. and is the college students to receive beliefs [1]. Ideological education and political guidance are two close subjects, which complement each other and are indispensable, so that the attitude of all members towards the political system will be greatly affected by Two courses guidance. However, for college students and even Internet aborigines who have access to the Internet at a very young age, they will have more convenient and comprehensive access to different value information transmission in the Internet environment, which makes their value judgments easily affected [2]. With the changes of the domestic and international situation, college students need to be further strengthened in terms of political literacy and identity and thus have updated and stricter requirements for Two courses teaching methods. With the continuous development and changes of the domestic and international situation, college students need to be further strengthened in terms of political literacy and identity, so

they have updated and stricter requirements for ideological guidance and political teaching. From an international perspective, China's internationalization process is accelerating, and some powerful developed countries are constantly invading China's culture. They try their best to dump their own values and mainstream ideas. This severe situation of cultural infiltration requires China to constantly improve its cultural soft power and the quality of Ideological and political education for college students. At this stage, with the rapid development of information technology, a variety of political forces are active with the help of network platforms, and the form of Ideological and political education for college students is becoming more and more complex. From a domestic perspective, the development model of socialism with Chinese characteristics has achieved certain results. With the continuous acceleration of the pace of reform, people's ideas have also undergone great changes, and the more extreme thoughts of some religions are constantly eroding the thoughts of college students. Therefore, it is necessary to establish a solid spiritual defense line for college students and help them establish a correct world outlook, outlook on life and values. The task of ideological education in socialist China is to take dialectical materialism and historical materialism as the guiding ideology, based on the understanding of the development law of the whole nature and human society, and gradually guide students to establish a scientific outlook on life and world outlook and cultivate their spirit of daring to practice, attitude of seeking truth from facts ,and scientific thinking methods.

With the use of newer and more comprehensive teaching materials and continuous improvement of educational methods, educational achievements have achieved certain success [3]. However, the philosophical part of ideological education has the characteristics of natural abstraction, and the political guidance also has a large number of abstract definitions and expressions. This leads to the fact that when studying this part of the content, the enthusiasm of college students is easy to decrease in a short period of time, and boring courses and low enthusiasm will form a vicious circle. Modern education advocates entertaining and entertaining, but the monotonous Two courses make it difficult to practice in combination with real life [4]. When other disciplines are related to real life and fully mobilize the enthusiasm, Two courses education, as a very important discipline, must also strive to move forward. Therefore, some experts put forward guiding opinions: boring theoretical knowledge should be explained in combination with vivid and interesting examples, and the central idea in the theory should be fully excavated, and it should be integrated into all aspects of teaching. Explaining and analyzing Two courses theories from different angles not only opens up students' ideas and insights, but also overcomes the singularity of this course [5, 6]. Combined with the high-tech teaching technologies emerging in the new era, the rational use of computer algorithms can open up a new world for Two courses education, from lesson preparation to class, to the arrangement of homework and final exams.

From the perspective of the Internet, we are in an era of big data. To solve the problem of how to reasonably use,

mechanical learning came into being. Nowadays, there are various popular and general machine learning algorithms, including decision tree algorithm which can process incomplete data; there is a naive Bayesian algorithm based on the principle of probability theory; there are vector machine algorithms that can map low-dimensional data to high-dimensional data; K nearest neighbor algorithm with K neighbors represents the nearest sample; there is an Ada-Boost adaptive lifting algorithm that can combine multiple weak classifiers into a strong classifier; there is a widely used Apriori mining association algorithm to reveal the association between samples; there are also EM clustering algorithms to establish core reclassification; there is also PageRank algorithm originated from the influence calculation of the paper [7–14]. Using machine learning algorithm technology to mine real data is the ultimate goal of big data processing. Only in this way can we reflect the ultimate value of big data. Machine learning algorithm has been applied in the government and enterprises for a long time and has achieved quite good results and achievements so that the government can better serve the people, and enterprises have made progress in product promotion, user portrait and advertising [15]. The application of machine learning algorithm in government management includes social policy, election analysis, disaster management, urban planning, and facilities. For example, there are risk modeling and prediction tools for policy and public interest issues, election analysis and prediction models, relevant codes for conflict prediction, urban traffic time series analysis using cyclic neural network models with multiple attention mechanisms, air quality prediction in Beijing and London in the next 48 hours, etc. Another data intensive place, where machine learning algorithms have just started and have not been used on a large scale, is the major universities in China. Teaching management, the data storage, and use methods of the last century are still used, resulting in low efficiency and waste of big data resources [16]. Modern colleges and universities generally pay more attention to students' cultural course performance, classroom performance, quality of homework papers, and the harmony of dormitory life. By collecting data in these aspects, the school's teaching quality and students' living environment have been improved [17]. However, the ideological field also needs attention similar to learning, so this study uses the Apriori algorithm to establish a teaching effect prediction model, aiming to broaden students' ideological horizons and strengthen their political beliefs. It not only enables college students to make great progress in their academic performance [18]. And finally, the prediction model established by this research can become a magic weapon.

2. Current Situation of Classroom Teaching of Thinking at Home and Abroad

Some developed countries abroad have developed a relatively complete set of systems because of their early education. It mainly provides Two courses guidance to students by combining civic, legal, and moral education. Moreover, the spread of religion and the ubiquitous history education

are also good helpers for education that cannot be ignored. The combination of traditional paper media, such as newspapers and books, emerging media such as TV and the Internet, as well as slogans and notices in public living spaces, makes foreign education systemic and pervasive [19]. However, in this traditional field, the application of related machine learning algorithms is still in its infancy in foreign countries. In my country, the means of Two courses communication have developed from the initial organizational learning and interpersonal communication to the present, and still cannot get rid of this essence. Organizational learning dissemination will be limited by the requirements of the venue and cannot achieve efficient dissemination [20, 21]. Interpersonal communication will be biased due to oral description, and the accuracy of learning will be greatly reduced. The energy of contemporary college students began to turn to smartphones and laptop screens connected to the ever-changing Internet, and new Two courses education positions came into being. Two courses education plays an important role in college education and teaching. It is a basic course to improve students' comprehensive quality and cultivate students' respect for the party and patriotism. It is very important to improve the teaching quality of the Two courses. By strengthening the construction of teachers, innovating teaching methods, changing teaching modes, and updating teaching concepts, we can realize the innovation of the Two Courses teaching methods, ensure the smooth implementation of teaching, and achieve the ideal teaching effect of the Two Courses [22]. In the past ten years, my country has actively responded to the changes in the new era, from setting up social accounts for publicity, to shooting videos that are entertaining and entertaining, to new media video websites, to developing dedicated learning apps, and even related learning game programs. Efforts in these new areas have paid off. Publicity and education in the digital position, and the time is flexible and discretionary. Moreover, the dissemination of texts, pictures, and videos will not cause dislocation of information like oral transmission in interpersonal communication, which greatly improves the accuracy and stability of communication. However, the transfer of communication positions is still on the superficial surface.

3. Introduction of Apriori Machine Learning Algorithm

3.1. *Apriori Algorithm.* In view of the above that classroom teaching, this paper establishes a widely used model building algorithm—machine learning Apriori algorithm. Apriori algorithm is a frequent item set algorithm for mining association rules. It is the most influential algorithm for mining frequent item sets of Boolean association rules. Its core idea is to mine frequent item sets through two stages: candidate set generation and downward closure detection of episodes. Its core is a recursive algorithm based on the idea of two-stage frequency set. This association rule belongs to one-dimensional, single-layer, and Boolean association rules in classification. Here, all item sets with support greater than the minimum support are called frequent item sets or fre-

quency sets for short. Apriori algorithm has been widely used in business, network security, and other fields. Apriori algorithm adopts the iterative method of layer-by-layer search. The algorithm is simple and clear, without complex theoretical derivation, and easy to implement. By integrating the teaching effect prediction model into the teaching information management system and collecting and students' basic information and Two courses ideas, using the Apriori algorithm to obtain the relationship rules between different items of related courses quickly and accurately calculate the weak links of students, and teachers can arrange teaching and strengthening tasks. Finally, in a period of application, the model accurately predicted and showed superior characteristics.

Nowadays, the algorithm is not only more than ten kinds mentioned above, but also evolving and updating the new requirements. Apriori algorithm has been widely used in the front line of data processing since its invention. This study chooses it for the following three reasons: First of all, the data immediately obtained in classroom teaching is a sparse data set, which is highly compatible; secondly, the principle of Apriori algorithm is simple and easy to realize the research requirements; finally, the college students' achievement data, ideological tendency data, political sensitivity data, and after-school learning data collected have strong correlation and complex internal relationship. It is suitable to use Apriori algorithm to establish effect prediction model for prediction and research.

3.2. *Establishment of a Model for Predicting Classroom Teaching Effects.* In the establishment of prediction model, Apriori algorithm is a method to find out the association rules between data samples. It can find the frequent data sets hidden in big data. The most classic case of Apriori algorithm in the research is to find the internal relationship between diapers and beer, put them together on supermarket shelves, and improve the sales of two commodities at the same time, which is the embodiment of Apriori algorithm in favor of decision-making. The iteration of Apriori algorithm is carried out layer by layer. First find out frequent data set 1, then find frequent data set 2 through data set 1, and so on. Apriori algorithm uses the implication expression from X to Y to reflect the association rules of two disjoint item sets X and Y. It uses the support rate and confidence rate to measure the association strength between X and Y.

$$S(X_n, Y_m) = P(X_n, Y_m) = \frac{num(xy)}{num(allsamples)}, \quad (1)$$

$$C(X_n Y_m) = P(x_\alpha | Y_m) = \frac{P\left(x_\alpha y_\beta\right)}{P\left(y_\beta\right)}. \quad (2)$$

S and C in Formulas (1) and (2) represent support rating and confidence rating, respectively, and *num* represents the total set.

Apriori algorithm is different from the old-fashioned data processing methods and cannot carry out violent search. Therefore, it is necessary to prune the collected
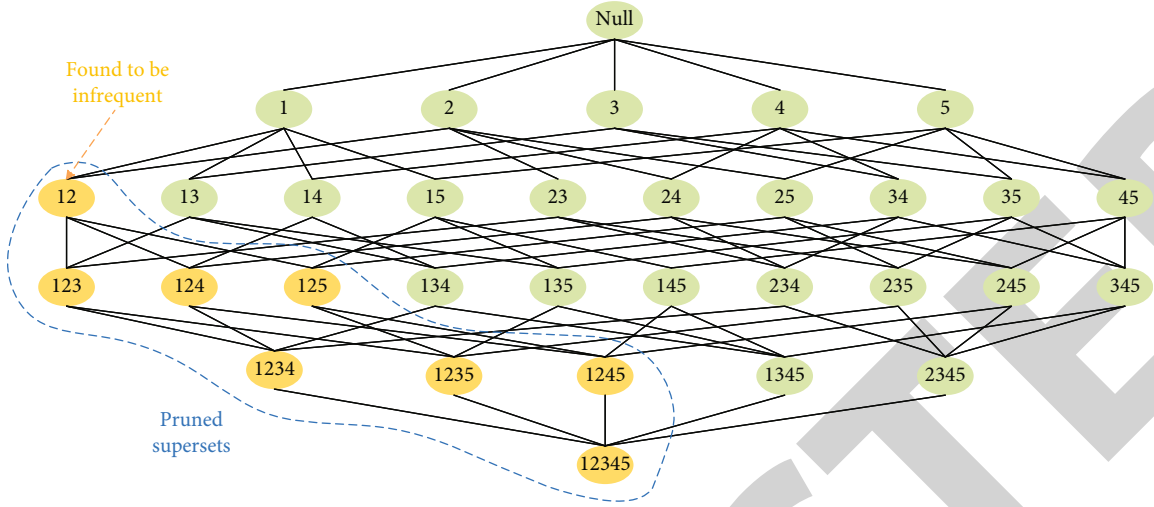
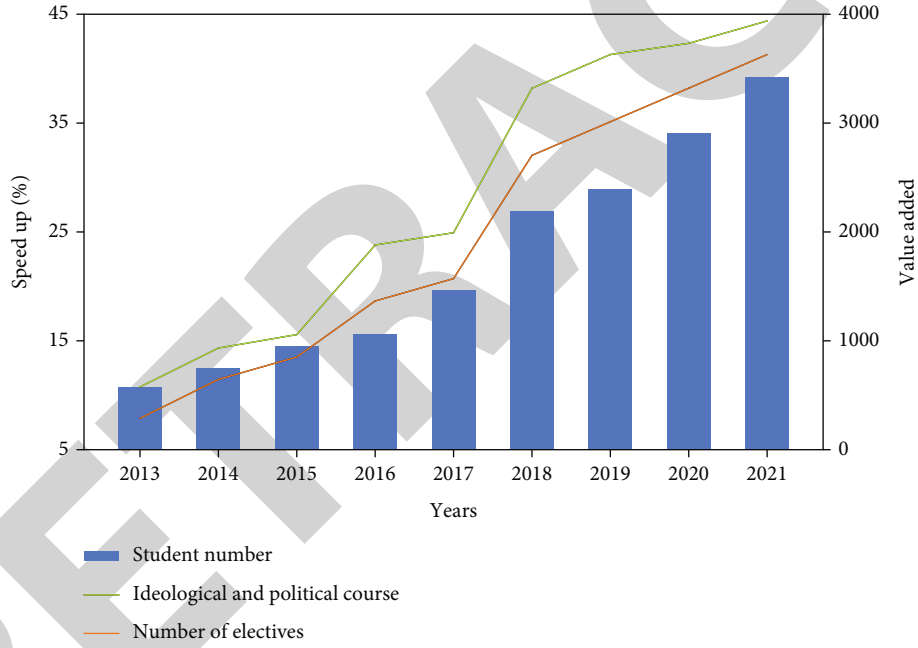FIGURE 1: Apriori algorithm tree pruning diagram.

FIGURE 2: From 2013 to 2021 student number, number of electives, and Two courses course growth rate map.

college physical training data. This operation is mainly based on two theorems of Apriori algorithm. The first theorem of Apriori algorithm: If a set in a system is a frequent item set, then all subsets related to it in the system are frequent item sets. The second theorem of Apriori algorithm: In a natural system, if any set is not a frequent item set, then all supersets in this system are not frequent item sets. As shown in Figure 1 below, first continuously subdivide the original data into several subsets, and finally merge the subsets into a collection of effective factors. Then find the subset AB that is not a frequent item set. According to the first and second theorems of Apriori algorithm, we can know that the sets containing subset AB are not frequent item sets, that is, the

subsets within the dotted line range in the graph. Finally, the pruning operation is completed by removing this part.

After pruning the original data, because the data obtained by the teaching information management application server is heterogeneous, it also needs to be normalized. First, use matrix Formula (3) to preliminarily classify and arrange the data:

$$D_T = \begin{bmatrix} d(x_1, x_1) & \cdots & d(x_1, x_T) \\ \cdots & \cdots & \cdots \\ d(x_T, x_1) & \cdots & d(x_T, x_T) \end{bmatrix}. \tag{3}$$
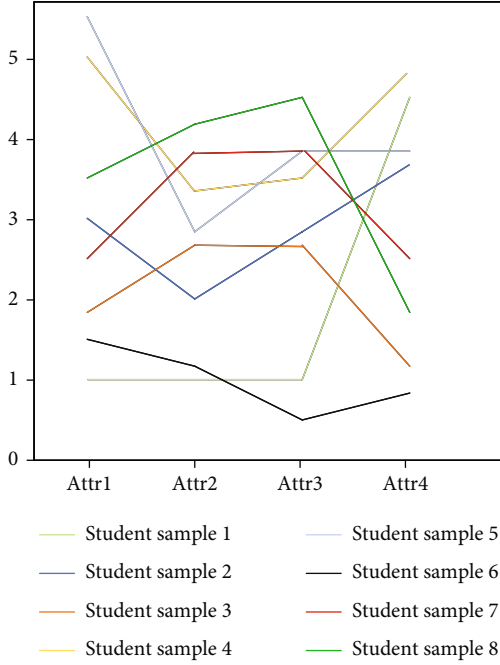
FIGURE 3: Distribution map of various characteristics of students in the Two courses teaching classroom.

T in the formula represents the total quantity of all data and then average value of the data.

$$\bar{R} = \frac{\sum_{i=1}^{T} R_i}{T} (i = 1, 2, \cdots, T). \tag{4}$$

$\bar{R}$ in the above formula represents the average value of R_i with a total number of T. Finally, the data is normalized by weighting the error according to the classification. The following formula needs to be used:

$$R = \bar{R} + d_{\min}(x_i, x_j). \tag{5}$$

After pruning and normalization, the data structure is unified, which is easier to mine and model later. The Apriori algorithm can also compensate for missing necessary data using computer autonomous learning methods. The approach to supplementing the data is a step-by-step approach. The first step is to compare some key factors with other students. The second step is to predict the obtained samples, so as to scientifically calculate the missing data. When constructing and constructing the teaching prediction model, we need to take into account the different teaching contents in the Two courses courses and the different types of papers in the Two courses examinations; the prediction vector of data positioning state is

$$\alpha = (\alpha_1, \alpha_2, \cdots, \alpha_n) \neq 0. \tag{6}$$

According to the strategic goals to be achieved by the relevant teaching plans of the college students, the diversified classroom teaching effect data of college students is trans-

mitted to the application server. When scheduling the data, the characteristic vector is used to refer to

$$x_\alpha^{(k)} = \left[x_{\alpha 1}^{(k)}, x_{\alpha 2}^{(k)}, \cdots, x_{\alpha N_{k-1}}^{(k)} \right]^T,$$

$$s_\varepsilon^{(k)} = \left[s_{\varepsilon 1}^{(k)}, s_{\varepsilon 2}^{(k)}, \cdots, s_{\varepsilon N_k}^{(k)} \right]^T, \tag{7}$$

$$y_m^{(k)} = \left[y_{m1}^{(k)}, y_{m2}^{(k)}, \cdots, y_{mN_k}^{(k)} \right]^T.$$

$x^{(k)}$ and $y^{(k)}$ in the formula represent the linear horizontal and vertical two-way input of the system, and $s^{(k)}$ represents the reversible and invariant output.

The predicted best teaching achievement is taken as the time-frequency feature in the model, so as to use this as the medium to reflect the most critical essential features of this prediction system. The aggregate of all data is N discrete dynamic distribution points $P = \{p_1, p_2, \cdots, p_N\}$. The time mean and frequency mean of the gain index of some students participating in this study can be calculated as follows:

$$t_m = \frac{1}{E} \int_{-\infty}^{+\infty} t |x(t)|^2 dt, \tag{8}$$

$$v_m = \frac{1}{E} \int_{-\infty}^{+\infty} v |X(v)|^2 dv. \tag{9}$$

After the above series of processing, an index system using a linear or approximately linear teaching effect prediction model is obtained. Based on this model, calculate the variance matrix C:

$$C = \frac{1}{N} \left[X_n - \overline{X_i} \right] \left[X_n - \overline{X_i} \right]^T. \tag{10}$$

Establish a linear discrete dynamic system that fits a variety of classroom data influencing factors, and realize the fitting of diversified data in the prediction model. The detailed expression method is the following formulas:

$$R_\beta X = U\{E \in U/R | c(E, X) \leq \beta\},$$

$$R_\beta X = U\{E \in U/R | c(E, X) \leq 1 - \beta\}, \tag{11}$$

$$bnr_\beta(X) = R_\beta X - R_\beta X_1.$$

It is necessary to merge frequent subsets into the parent set with universal influence and select the number of main sets according to the influence degree of variance accumulation. Only when the variance accumulation reaches a certain contribution, the corresponding subsets can be merged into the universal parent set. Through the above dynamic fractal design, this study realizes the establishment of the prediction.
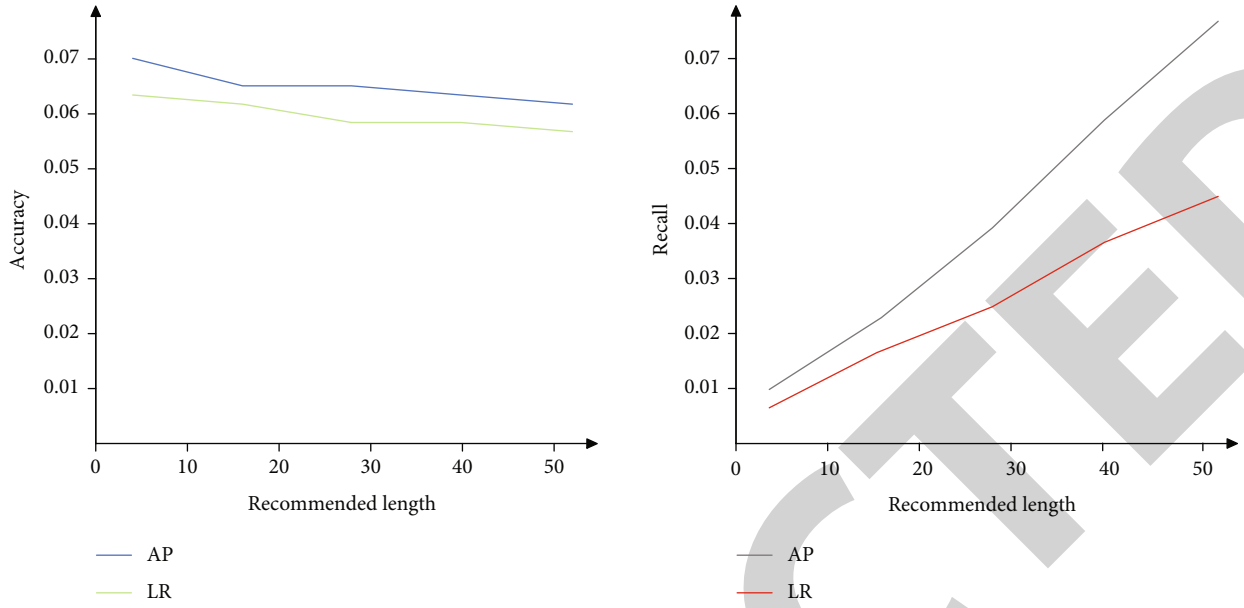
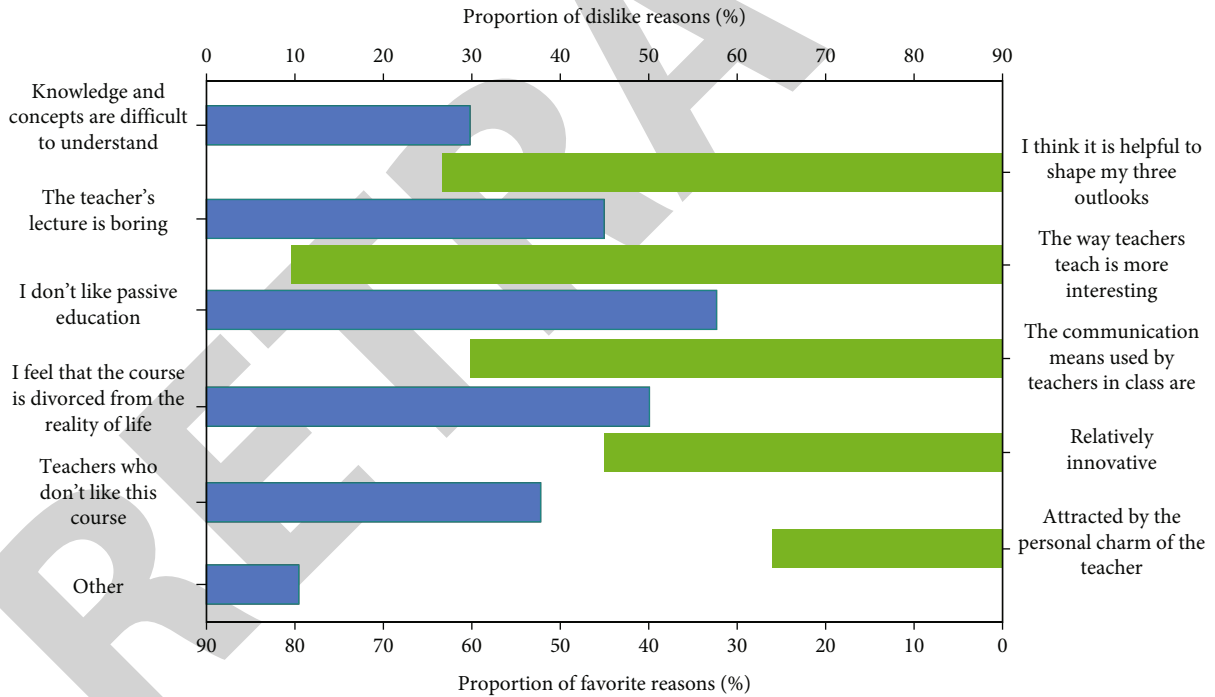Figure 4: Comparison plot of precision and recall for two different algorithms.

Figure 5: Investigation results of the reasons why college students like and dislike Two courses courses.

4. Analysis of Application Results of Prediction Model

After using the machine learning Apriori algorithm to establish the teaching effect prediction model required for the research, a university in the northern region ranked higher in the test was selected as the experimental object. First, the number of students who participated in the training and the results obtained in the previous years are obtained through the educational information system of this university. The specific results after pruning are shown in Figure 2.

Students in this university, from 2013 to 2021, the corresponding subject education has also flourished, maintaining a relatively high rate of growth. The number of compulsory Two courses courses and elective Two courses related auxiliary courses is also increasing rapidly.

Because the Apriori algorithm also needs to scan and analyze the attribute features of the selected high-efficiency
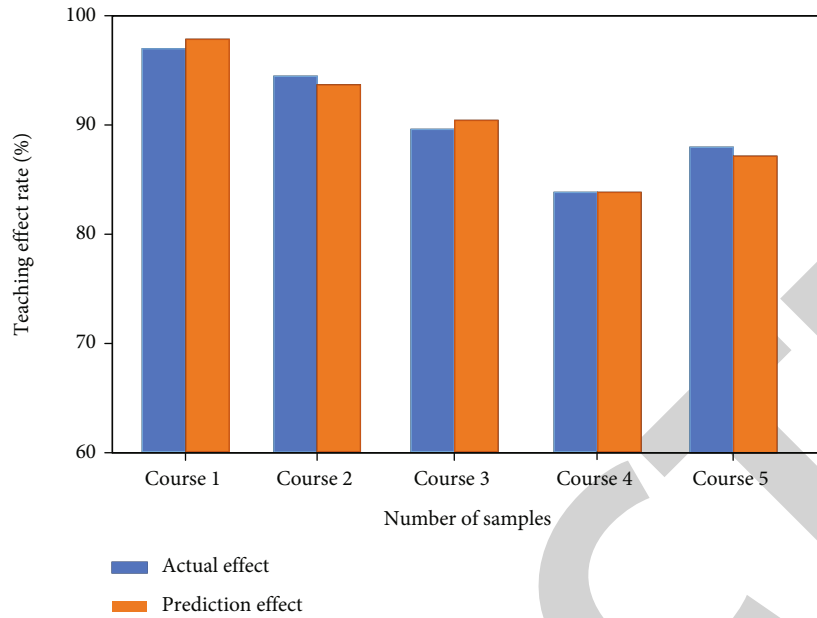
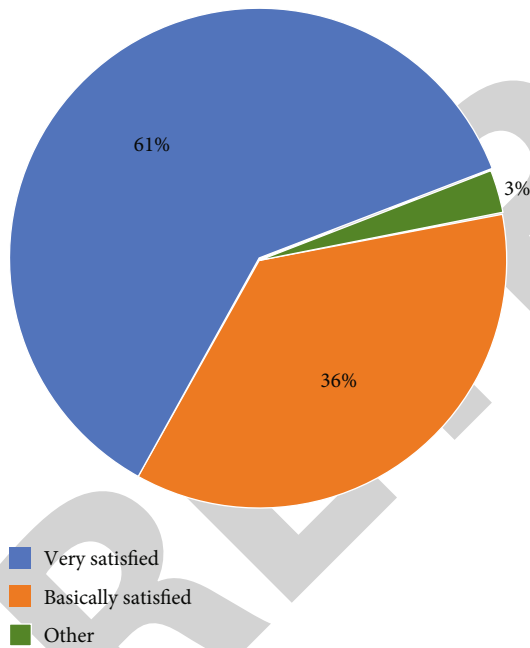FIGURE 6: Comparison of the predicted results.

FIGURE 7: Satisfaction survey results of the classroom effect prediction model.

college students, and automatically filter invalid features for many attribute features, therefore, the prediction model is used for analysis. Since many relevant data attributes are consistent, the results obtained after screening and analyzing the database according to the established teaching effect model are shown in the figure below.

As can be seen from Figure 3 above, there are 8 samples of common characteristic attributes of college students calculated by Apriori algorithm. It shows that the eight Two courses classroom teaching data have four common dynamic attribute

characteristics: attr1, attr2, attr3, and attr4. It shows that although there may be many data attributes in the Two courses classroom, the attributes that managers and users really pay attention to are not all the characteristics. Only by focusing on the analysis of these four types of characteristics, we can predict them more accurately.

In order to more intuitively analyze the experimental results of Apriori algorithm, this paper uses Apriori and logistic regression algorithms to predict the teaching effect of two courses. Then, the two methods analyze the Two courses classroom data of the same sample (Figure 4).

The left side of the above figure is an intuitive comparison of the accuracy of the two different algorithms. The accuracy of the prediction effect using the Apriori is recommended by the logistic regression algorithm. The right side of the above figure is a line chart comparing the recall rates of the two different algorithms in the case of different bytes. As the number of people increases, the recall rates of the Apriori algorithm and the logistic regression algorithm are also increasing. When the number of students in a single class is 45, the acceptable recall rate is reached. At this time, the recall rate using Apriori algorithm is 4.5%, while the recall rate using logistic regression algorithm is about 6.3%. The comparison shows that the prediction effect filtered by Apriori algorithm is better than that of logistic regression algorithm.

In this top-ranked school in the northern region, 150 students were selected for the experiment, and questionnaires were firstly distributed to conduct basic surveys on these 150 college students. According to the survey results, 52 of the students maintained positive emotions towards the courses they received and liked the relevant teaching very much. Thirty students expressed negative emotions, believing that these courses are not helpful for life and study and are reluctant to take the initiative to acquire knowledge in this area. The rest of the students remained neutral. It can

be seen from this that a large proportion of students are not interested in or do not pay enough. Figure 5 shows the survey results of the reasons why college students like and dislike Two courses courses.

After completing these preparations in the early stage, the established model is actually applied to the prediction of the real classroom teaching effect. By comparing the predicted results with the actual teaching results, the following results can be obtained.

It is not difficult to see from Figure 6 that the actual teaching effect achieved by courses using different teaching materials is greater than 85%, indicating that after efforts to improve in recent years, this university teaching. The maximum difference between the actual teaching effect and the prediction effect is 2%. In the prediction model of machine learning algorithm, the allowable range of prediction difference is 0 to 6%, and 2% of the results are in the area of accurate prediction within the range. These results show scientific and reliable in the practical application of Two courses classroom teaching prediction.

After completing the one-semester Two courses classroom teaching prediction experiment, this study conducted a satisfaction survey on the 150 college students who participated in the experiment and the teachers who taught them by distributing questionnaires, as shown in Figure 7.

The results show that 61% of the 150 college students who participated in the experiment and the teachers who taught them are very satisfied with the model. Through the interview survey, it is found that teachers can use the prediction model to make the first step prediction after lesson preparation. If they do not meet their expectations, they can adjust the Two courses curriculum in time. The point that students are very satisfied with the prediction model is that the prediction model can help students choose their own two courses and greatly improve their learning efficiency. Another 36% of the teachers and students were basically satisfied with the prediction model, and the feedback said that it still needs to be used for a period of time to run in and adapt. Another 3% of the teachers and students gave an unsatisfactory evaluation of the prediction model because it was difficult to use.

To sum up, the application of the teaching effect prediction model based on the machine learning dynamic algorithm improves the interaction and participation of students in the classroom and provides opportunities for college students who choose this course to participate and practice in person, which is similar to the old courses. Interesting teaching methods are conducive to improving the enthusiasm of college students to attend classes on time so that more students can truly understand and recognize the abstract content and importance of philosophical thinking and political participation. At the same time, the prediction model of classroom teaching effect based on machine learning algorithm has explored and practiced an innovative educational model that connects online and offline and extracurricular and intracurricular.

5. Conclusion

Universities are constantly endowed with new connotation, and the educational modes and methods are constantly innovated and changed. Two courses education is not only theoretical interpretation, but also the integration of knowledge and practice. We should pay attention to both Two courses theory teaching and social practice. Social practice is due to various subjective and objective reasons. Therefore, most of the Two courses teaching is still based on theoretical knowledge.

This paper proposes innovative research on related teaching content and achieves the purpose of predicting the effect of Two courses using the Apriori algorithm to build a prediction model. It clearly shows that the prediction model of college Two courses classroom teaching effect based on machine learning Apriori algorithm technology can effectively enhance students' participation and interaction in classroom and extracurricular and greatly stimulate interest in related fields. The selection and basic information of Apriori algorithm applies it in practice and establishes that the prediction model is investigated. Compared with the logistic regression algorithm, it is concluded that the model established by the Apriori algorithm selected in this experiment has higher accuracy. Finally, the prediction model was added to a real classroom in a university, and after a semester of use, the results were better than expected. After one semester of use, it has achieved better results than expected. After comparing the predicted results with the actual results, it is found that the difference of accuracy is no more than 2%, which is much better than the expected 6%. At the same time, most of the 150 students who participated in this experiment expressed their love for the prediction model, saying that this model has greatly improved the fun of the classroom and made the previously boring content lively and interesting. But there is no end to learning. There is still room for improvement in both the algorithm and the established model. The efficiency of processing data can also be improved by optimizing the code.

Data Availability

The figures used to support the findings of this study are included in the article.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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