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Design of a College Student Management Platform Based on Embedded Neural Network Algorithm for Network Security Technology

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Abstract:

With the rapid development of computer science and network technology, the education system is undergoing unprecedented changes, and the scale of universities continues to expand, which poses more stringent challenges to building an efficient and intelligent campus network environment. In this context, this study focuses on exploring optimization strategies for student management in the context of online culture, particularly by integrating embedded networks and data analysis technologies to deeply analyze new dimensions of learning status monitoring. We innovatively apply an anomaly detection mechanism based on embedded networks to conduct a detailed analysis of students' learning status. By constructing a complex learning behavior model based on embedded networks, the system can intelligently identify students with abnormal learning states and achieve precise control over their learning status. The system is deployed in a Windows environment and integrates high-performance databases to meet and efficiently manage the needs of massive data. The system has specially designed an administrator login interface, which is intuitive and easy to operate, allowing administrators to quickly access and query student management information. These information collected and analyzed with the support of embedded network technology greatly assist university educators in making scientific decisions and efficiently executing student management work.

Keywords: Student Management; Embedded Network; Anomaly Detection;Network Security Technology

1.INTRODUCTION

The comprehensive penetration of the Internet, with its massive content, open ecology, global communication, real-time retrieval and seamless interaction, has profoundly reshaped people's learning style, lifestyle and cognitive system [1]. This change has brought unprecedented opportunities for current student management work, but it is also accompanied by complex and ever-changing challenges. The prevalence of internet culture has prompted student administrators to continuously improve their strategies and skills to meet the demands of the new era. The Internet has crossed the boundaries of time and space, enabling student managers to immediately grasp students' learning progress, living environment and even psychological state, and promoting management to be refined and personalized [2]. At the same time, the Internet has also greatly broadened the way of student management. Through the deep excavation of network resources, student managers can learn from advanced educational management concepts and practice cases at home and abroad, and continue to improve professional quality and management efficiency. With the rapid development of computer and network technology, as well as the deepening implementation of education system reform, key universities are accelerating the pace of informatization and intelligent management, committed to building an efficient and intelligent campus management system. In this context, the importance of the teaching management system as the cornerstone of campus information construction is increasingly prominent [3]. This system not only carries the recording of students' learning process and the arrangement of teachers' teaching activities, but also involves the optimization configuration and scheduling of teaching resources. Therefore, how to use the most cutting-edge computer technology, especially embedded network technology, and advanced teaching management concepts to jointly create an intelligent and modern teaching management system has become a key issue in promoting campus informatization construction [4]. The deep integration of embedded network technology can not only significantly improve management efficiency, reduce human errors and interventions, but also provide accurate decision-making basis for managers through deep mining and analysis of teaching data [5]. More importantly, the teaching management system based on embedded networks can automatically optimize resource allocation, standardize information management processes, and lead university teaching management towards a more scientific and intelligent new era [6].

2. STATE OF THE ART

All major universities in China are faced with this competition and need to continuously improve their management level. While improving the management level, it has also continuously applied domestic computer technologies to develop teaching management systems [7]. Since the development of management information systems in the last century, it has been applied in many fields. As the cradle of the future, schools should make use of advanced technologies and teaching concepts such as computers and networks to open a modern teaching management system [8]. The earliest teaching management system mainly adopts the C/S (Client/Server) mode, and the C/S service mode is relative to the B/S service mode [9]. Due to technical reasons, the traditional teaching management system mainly uses C/S service. C/S service is a LAN-based service, the user accesses the terminal in the LAN and interacts with the server of the system to obtain the required content. Under C/S services, the client needs a terminal to run the system, and such services are suitable for smaller, more secure environments. The C/S service model is relatively simple in system implementation because of its simple service concept [10]. Facing the students surrounded by the Internet, students need to enter with a new mentality [11]. The Internet and more open-minded students are needed to test it. The state has put forward clear requirements for the application of the Internet in the construction of information-based campuses [12]. Student management workers should eliminate the prejudice against the Internet, learn to find the advantages of the Internet and apply it flexibly in student management. In the era of "Internet +", schools and teachers cannot avoid and refuse the Internet. The only thing to do is to accept, apply and integrate [13]. In student management, we should fully trust students. According to their age characteristics, meet their learning and life needs, so that they can truly learn and apply what they have learned [14]. Make full use of QQ, WeChat, Weibo, E-mail, private rooms and other network means to find students in the virtual society. Be there to listen to their authentic voice and respond positively to their needs. Theory teachers, class teachers, counsellors and outstanding students are encouraged to establish online interactive platforms such as blogs [15]. Promote teacher-student interaction, and expand ideological and political education and student work space. Non-network mental health education should be carried out to improve students' immunity to the Internet [16]. Due to the lack of experience and experience, teenagers are excessively addicted to games, novels, chats and entertainment websites on the Internet, which is different from people's behaviour habits and mental illness [17]. It is necessary to cultivate students' sense of self-discipline and transform people's external management into internal self-management, so as to stimulate students' awareness of safety and health and develop healthy self-protection online habits [18].

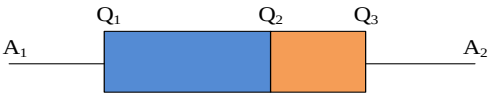
3. METHODOLOGY

3.1 Analysis of student learning state based on outlier detection

In the context of student management in universities, outliers (also known as outliers) refer to student performance or behavior data that deviates significantly from other data objects in the dataset, as if generated by different mechanisms. These data objects may conceal important information, such as abnormal learning status of students, potential academic misconduct, or special needs for specific teaching resources. Traditional outlier detection algorithms, such as the ant colony algorithm inspired by ant foraging behavior (proposed by Marco Dorigo in 1992), although not directly applied in this field, their probabilistic search and optimization ideas provide inspiration for developing complex student behavior analysis models. However, in the specific application of college student management, we tend to adopt advanced algorithms that combine machine learning and data analysis techniques. In the university student management system, all data objects such as grades and behavior records of students are considered potential outlier candidates. By applying specialized outlier detection algorithms, we can identify students with abnormal exam scores or behavioral patterns. However, it is worth noting that due to the limitations of algorithm design and the complexity of data, not all detected anomalies are directly equivalent to abnormal learning states of students. Therefore, for the detected outliers, it is necessary to further analyze them in depth by combining multidimensional information such as student background and teacher feedback, in order to accurately determine the underlying reasons.

Local outliers refer to data points that are particularly prominent in their specific population or subset, which helps us to more accurately locate the problem. In the anomaly detection of college student management, our goal is not only to identify outliers, but more importantly, to understand the reasons behind these anomalies and take corresponding management measures accordingly. To achieve this goal, we can combine density based anomaly detection algorithms with statistical based anomaly detection methods to form a hybrid two-stage

anomaly detection strategy. In the first stage, density based algorithms (such as local outlier factor algorithm LOF) are used to identify anomalous regions in the data; In the second stage, statistical methods are used to conduct in-depth analysis of the data in these abnormal areas to determine which data points truly represent the abnormal learning status of students. Through this method, we can not only effectively identify abnormal situations in student management in universities, but also provide scientific and comprehensive decision support for managers, helping universities achieve more accurate and efficient student management.



Figur.1 Box Figure

The formal definition process of local outliers is as follows: Define the k- k-distance of object o. $dist_k(o)$ sets the D of a given object, and represents the k- distance of the positive integer k and o to $dist_k(o)$, which is the distance $dist(o, p)$ between o and other objects p∈D. So that at least there is an object $o' \in D \setminus \{o\}$, which makes $dist(o,o') \le dist(o, p)$ At most, there is a k-l object $o'' \in D \setminus \{o\}$, which makes $dist(o,o'') < dist(o, p)$. The k- k-neighbourhood of the object o is defined. All objects of $N_k(o)$ the o k- and o neighbourhood cover a distance not greater than $dist_k(o)$, as shown in equation (1). Because there may be equal distances between multiple objects to o, the number of objects in $N_k(o)$ may exceed k.

$$N_k(o) = \{o' \mid o' \in D \setminus \{o\}, dist(o,o') \le dist_k(o)\} \quad (1)$$

Define the reachable distance of the object o to p: $reach\_dist_k(o, p)$

$$reach\_dist_k(o, p) = \max\{dist_k(p), dist(o, p)\} \quad (2)$$

The distance calculating formula is shown in (2). When the distance from o to p is less than p to k-, the reachable distance is $dist_k(p)$ instead of the actual distance. This will significantly reduce the statistical fluctuation of distance measurement caused by objects close enough to o. The four-point method is a statistical outlier detection algorithm, as shown in Figure 1. It can be visualized by a box diagram. The box diagram is from the minimum observation value A_1, the first quantile Q_1, the median Q_2, the third percentile Q_3 and the maximum observation value A_2. Describe the characteristics, by formula (3) said the beard (The left side of A_1 and the right side of A_2). Among them, the $\delta > 0$ represents the coefficient.

$$p \in \{o \mid o \in (-\infty, Q_1 - \delta * (Q_3 - Q_1)) \| o \in (Q_3 + \delta * (Q_3 - Q_1), +\infty)\} \quad (3)$$

The rule for identifying outliers is to set up the data set in ascending order. Pick out the first four quantile Q_1 or third four quantile QY_3 above $1.5*(Q_3 - Q_1)$ value, that is, $\delta > 1.5$. In order to cover outliers as much as possible, the quartile point method is used to detect outliers and get the minimum value $\delta = 1.5$ of the above rules. Therefore, on the basis of calculating the LOF of each object, the four-point method is used to detect outliers. Then the outliers can be expressed (4).

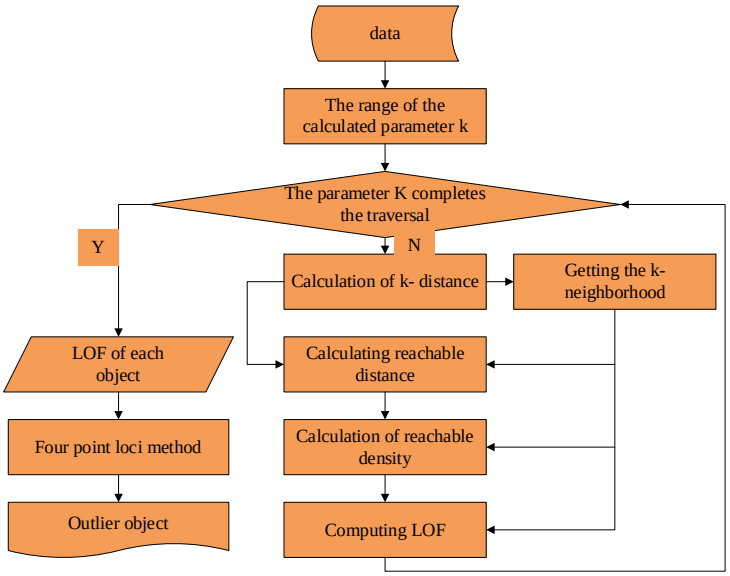


Figure 2 Flow chart of hybrid two-phase outlier detection algorithm

$$p \in \{o \mid o \in (-\infty, Q_1 - 1.5*(Q_3 - Q_1)) \| o \in (Q_3 + 1.5*(Q_3 - Q_1), +\infty)\} \quad (4)$$

The process of the hybrid two-stage outlier detection algorithm is shown in Figure 2. From the graph, it can be seen that a series of processes in front are used to get the LOF of each object, and then use the four-point method to detect outliers. According to the degree of outliers, the method estimates two variables and identifies each object as an outlier or normal object. Finally, the outliers of the whole data set are obtained.

3.2 Optimization of Embedded Neural Network Algorithm

In traditional training methods, the training process of RBF (Radial Basis Function) neural networks is often fragmented into two relatively independent steps, which weakens the overall performance and consistency of the network. To compensate for this deficiency and introduce the concept of "embedded network" to optimize the training process, we encode the core parameters of RBF network - the center and corresponding width, as well as necessary network weights - into a single chromosome to achieve unified management and optimization of parameters. In embedded network architecture, the selection of the center and its corresponding width adjustment, which is the core of RBF network, become particularly critical. We adopt an innovative coding strategy of arranging them in alternating order of center and width to ensure their close connection and mutual influence during the evolution process. At the same time, a preset initial number of hidden layer nodes P is set, and the P value is dynamically adjusted based on the actual performance during the training process to accurately match the complexity of the network with the problem requirements, until the expected accuracy target is achieved.

For each chromosome (i.e. the parameter configuration of the network), its length consists of three parts: the number of input nodes M, the number of hidden layer nodes P (dynamically adjusted), and the number of output nodes N, which together determine the structure of the chromosome as MP+P+NP. This encoding method not only reflects the diversity of network structures, but also facilitates efficient search and optimization by genetic algorithms. In the application of genetic algorithms, setting the initial population size is an important trade-off point. A larger population size helps to enhance the exploration ability of the solution space and increase the possibility of finding the global optimal solution, but it also correspondingly prolongs the running time of the algorithm. On the contrary, although smaller population sizes can accelerate convergence, they may increase the risk of falling into local optima. Therefore, choosing the appropriate population size is crucial for algorithm performance.

$$fitness = \frac{1}{\sum_{i=1}^{N}\sum_{j=1}^{k}\left[Y_j(i) - \bar{Y}_j(i)\right]^2} \quad (5)$$

Among them, $Y_j(i)$ and $\bar{Y}_j(i)$ denote the time input and expected output of training data i at j output contacts, respectively. K and N are the number of output nodes and the number of input data, respectively. Then the selection operation. The choice operation is the gambling wheel selection (proportional selection) method. This selection operation is the most common operation in genetic algorithm selection. In this selection method, roulette is the sum of the fitness of all individuals. According to the fitness of each individual, each person corresponds to some parts of the roulette in the roulette. The selected individual is the corresponding individual in the roulette wheel after rotation. Its specific steps are as follows: 3 random numbers are first generated, and then transformed into the real number locations that need cross-operation. Finally, arithmetic crossover is used to compute 3 pairs of real numbers to generate the next-generation group. The so-called arithmetic crossover is a linear combination transformation of 2 real numbers. The process of converting them into 2 new individuals. First, suppose that arithmetic crossover is used to calculate X_k and Y_k in parent chromosome:

$$\begin{cases} X_k^{l+1} = \beta X_k^l + (1-\beta) Y_k^l \\ X_k^{l+1} \beta Y_k^l + (1-\beta) Y_k^l \end{cases} \quad (6)$$

In the formula, β is a constant in the range of (0, 1). Then the mutation operation is carried out. In binary encoding, the inverse operation of the selected variant is needed to take first. If it is "1", it will become "0", if it is "0", it will become "1". However, the real number coding is used. It is far different from the binary code. By using the 2-point mutation method, the location of the variation point is randomly generated. The selection method of specific method and intersection point is the same. Then, in the range of parameter values, 2 random numbers are generated. They are used to replace all the real numbers of the variation point. The new individuals after replacement are selected as the next generation of chromosomes. Because the personnel structure of the school is the most complex, the objectives are highly diversified, and the management modules are the most important, it is necessary to analyze and deal with each management process and business project to make the system optimal. In general, the school's educational administration management system includes the following modules: student status and score management, administrative affairs office information management, teaching materials management, student quality development management, teacher teaching quality evaluation, system maintenance, etc. As the basis of each department, the formulation of the teaching plan module is very important. In general, the teaching plan refers to the users of the teaching and research office and the Teaching Affairs Office as units to formulate and modify the course learning plan for students according to the training plan of the school. After discussion with each department (department level, faculty level), the teaching plan approved by the Dean's office or the head of the college's education department is submitted to the school's teaching department for further review, and the reviewed teaching plan can be posted on the campus website. Once the teaching plan is published, it cannot be modified at will, because it is for the whole school, so the review must be rigorous. If the published teaching plan needs to be modified, the Teaching Affairs Office should be notified to re-implement and re-examine it. In the process of system design, a lot of tables are generated, and the main data tables are listed in the system. Table 1 and Table 2 are the main data tables involved in the online examination system.

Table 1 Score information table

Realm name	Type of data	Major key	Increment	Empty allowed	Description
Score ID	int	Yes	Increment 1	Not allow	Performance mark
UID	char	No	No increment	Allow	Examination mark

Paper ID	int	No	No increment	Allow	Mark of test paper
Front Score	int	No	No increment	Allow	Achievement of objective questions
Back Score	int	No	No increment	Allow	Results of subjective questions
Total Score	char	No	No increment	Allow	Gross score
Right Rate	char	No	No increment	Allow	Rate of accuracy
Exam Time	char	No	No increment	Allow	Date of Examination

Table 1 shows the achievement-oriented students participate in the curricula variable, the mark of score ID is the primary key of the student's test result and score information table, UID is the exam,1 represents the student, and 0 represents the grading teacher, the paper ID is the number of papers, represents the specific student's papers, the score is in front of the objective mark problem, the score is the main The total score is the total score of the test paper, the correct rate is the correct rate of the student's answer, and the exam time is the date on which the student participates in the exam.

Table 2 Basic information of candidates

Realm name	Type of data	Major key	Increment	Empty allowed	Description
User ID	Int	Yes	Increment 1	Not allow	Examinee mark
Name	char	No	No increment	Allow	Name of examinee
Pass Word	char	No	No increment	Allow	Registered password
Sex	bool	No	No increment	Allow	Sex
Address	char	No	No increment	Allow	Home address
Phone	char	No	No increment	Allow	Contact number
Email	char	No	No increment	Allow	Mailbox
Role	Int	No	No increment	Allow	Administrator id

As shown in Table 2, the basic information table of candidates is different from the basic information table of students in the whole system. This table only records the basic information of students participating in the exam, in which User ID is the identity of students, Name is the name of students, Pass Word field is the login password of students, Sex field indicates the gender of students, and user ID is the password of students. The Address field indicates the student's address, the Phone field indicates the student's contact information, The Email field indicates the student's email address and the Role field indicates whether the user is a teacher or a student. The database operation function is to complete the operation of the data in the database; You can insert, delete, and modify data in the database to backup and restore the database. There are many tables in the design process of the system, which list the important data tables. Among them, Table 3 and Table 4 are the main data tables involved in the online examination system.

Table.3 Information sheet of scores

Domain name	Data type	Primary key	Auto-increment	Allow empty	Description
Score ID	Int	Yes	Auto-increment 1	No	Performance mark
UID	Char	No	No auto-increment	Yes	Examinee ID
Paper ID	Int	No	No auto-increment	Yes	Examination mark
Front Score	Int	No	No auto-increment	Yes	Achievement of objective questions

Back Score	Int	No	No auto-increment	Yes	Achievement of subjective questions
Total Score	Int	No	No auto-increment	Yes	Total fraction
Right Rate	Char	No	No auto-increment	Yes	Correct rate
Exam Time	Char	No	No auto-increment	Yes	Examination date

Grade information Table 3 shows the grades of students who participated in the course selection; The score ID is the mark of the student's test score and the primary key of the score information table. UID is the test score, 1 represents the student, 0 represents the teacher; The paper number is the paper number, that is, the paper that the student participated in; The first score is the achievement of objective questions; The final score is the result of the subjective question; The total score refers to the total score of the test paper; The correct answer rate is the student's correct answer rate. "Test Time" is the test date.

4. RESULT ANALYSIS AND DISCUSSION

This study focuses on the design and implementation of a university student management platform based on data mining technology and embedded network integration. By deeply integrating advanced embedded network technology and data analysis strategies, we have successfully created an efficient and intelligent student management platform. This platform not only achieves comprehensive control over students' basic information, but also provides solid data support and decision-making insights for university management by deeply analyzing students' learning behavior patterns, academic dynamics, and potential needs. This platform utilizes data mining algorithms to conduct meticulous mining and analysis of a vast student database. It comprehensively considers multi-dimensional information such as students' course selection preferences, academic records, and daily behavior performance, accurately identifying students' learning status, areas of interest, and possible learning obstacles. It is particularly important that with the powerful capabilities of embedded network technology, the platform can process and analyze these complex data in real time, predict the development trajectory of students' academic performance, and provide a solid data foundation and scientific basis for customizing personalized teaching plans. In order to verify the feasibility, effectiveness and progressiveness of the platform, this study carefully designed a series of comparative experiments. We selected two classes from the same major in the second year of a certain university as research subjects, taking English courses as an example, to ensure that the two classes maintain a relatively balanced student population, gender ratio, and English learning foundation. Among them, Class A, as the experimental class, adopted a campus multimedia comprehensive teaching network system embedded with embedded network technology for online teaching; As a comparison class, Class B adopts traditional English teaching methods.

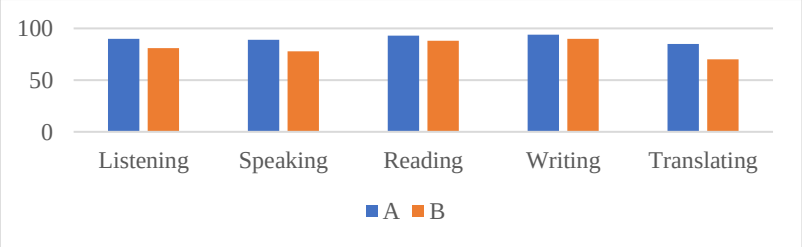


Figure 3. Comparison of experimental results

Software testing is a systematic process that is planned and can be explicitly checked. The goal of software testing is to detect errors and remove them after successful testing. The two main methods of dynamic testing are black box testing and white box testing. Each has its advantages and disadvantages, as well as its focus. Depending on the characteristics of the system, the final test plan is to use white box testing for unit testing and black box testing for system verification testing. In the test process of the teaching management system, the function test is a very important part, mainly to verify and check each function, through the test to see whether

the function of the system meets the user's requirements for the function when the actual login. The following is an example of the main test part of the system function test: Main page link test: Test each link to know if you can jump to the correct page after clicking. Link is a major feature of a WEB application system, link test is mainly to test whether all the links of the system are correctly linked and whether the page after the jump exists. Role login in a system test: Ensure the correctness of the login interface and the error tolerance and correction capability when errors occur. By entering the wrong user name and password in the login box, the system detects the operation of the system and requires the system to provide correct error indications when exceptions occur. Button function test: In the test system, whether it can normally add, modify, delete, cancel and other functions. Duplicate information testing: In some property values, duplicate information should be entered at the unique information, including upper and lower case, space, to test whether the system can handle the duplicate, report the error, and perform normal processing. After a series of functional tests, the system can better consider the user's limitations and requirements, while the user can operate and use the system normally, the system can meet the needs of users. Of course, there were some problems during the testing process, such as the connection between some modules that needed to be optimized. A mixed two-stage outlier detection algorithm was applied to acquire 19 outliers. Combined with other information about other students, it can be seen that there are 17 students with abnormal learning conditions. These students are badly in need of personalized learning guidance for student workers to change these students' poor learning status. It prevents students from learning helplessness and produces worse learning outcomes. From the results, the accuracy of the algorithm is precision=17/19=89.47%, with high accuracy and the number of people covered is coverage=17. But in this grade, are there only some students who are abnormal in learning conditions? Combined with the more information of these students in Figure 4. These untested students also have abnormal learning conditions, and they are also in urgent need of personalized learning guidance for these students.

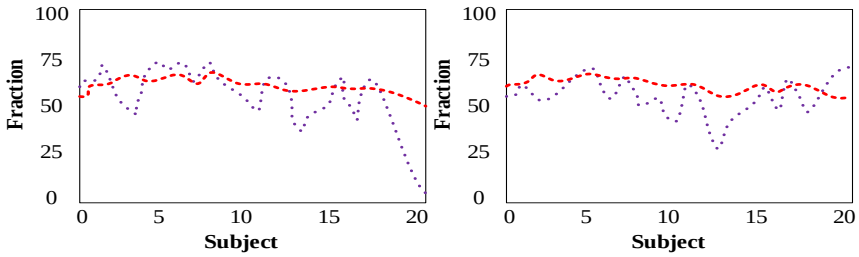


Figure.4 A line chart of the grade and grade average of the suspicious outliers

In conclusion, the analysis of students' learning state based on outlier detection is used. The hybrid two-stage outlier detection algorithm has high accuracy in solving this problem. However, the number of outliers detected by the algorithm is relatively small or fails to effectively detect some potential outliers. The total number of students whose learning state is abnormal is less. Later, some improvement measures will be used to optimize it. Figure 5 shows the new student's score relative to the grade average score. The transverse coordinates represent the subjects and the ordinates represent the results. The rough black real line represents the average grade of each course in the grade. The black line shows the students' actual performance on the course and the score at the point line is 60 points.

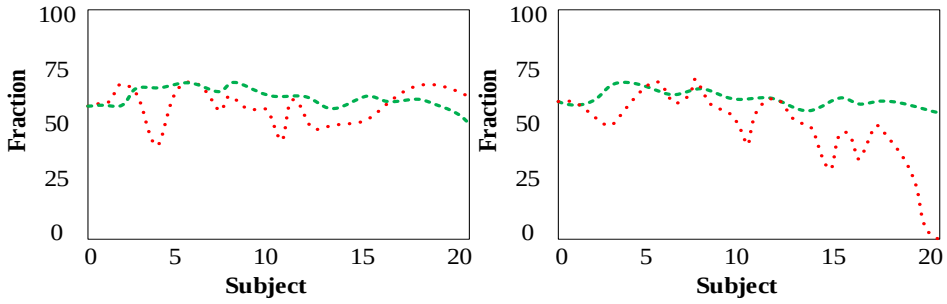


Figure 5 A folding map of the new students' grades and the average grade of grade after adding artificial attributes

In data mining, there is no definitive way to test whether a point is an outlier. In one - and two-dimensional attribute Spaces, visualization can be used to make intuitive judgments. But it is also difficult to have a clear quantification. Most of the time it is combined with more information about the data object, judged by domain knowledge or general knowledge. Therefore, there is no clear quantitative criterion to determine whether an outlier is an abnormal student. It is based primarily on more information about the student, recognition data on achievement and experience as a student. An improved hybrid two-stage outlier detection algorithm is used to detect outliers in the first semester of freshman year and the first semester of sophomore year. Compared with the original algorithm without improvement, the cost of manual attribute extraction and data standardization is increased in the data preprocessing stage. At the same time, the algorithm may be repeated many times, increasing the time consumption of many times. An improved hybrid two-stage outlier detection algorithm was used to extract 59 outliers. The original algorithm added 40 people, 37 of whom had abnormal learning status. The accuracy comparison is shown in Figure 6. The accuracy of the improved fusion algorithm is lower than that of the original algorithm, artificial attribute algorithm and iterative improvement algorithm. A comparison of the number of people covered is shown in Figure 7. The improved fusion algorithm has a larger coverage than the original algorithm, artificial attribute algorithm and iterative algorithm. The problem is unbalanced. The cost of learning dysfunctions is much higher than that of students who lose their learning status. The improved algorithm realizes the optimization of the original algorithm in terms of the number of people covered. The total number of students with abnormal learning states is increased, which greatly solves the problems existing in the original algorithm.

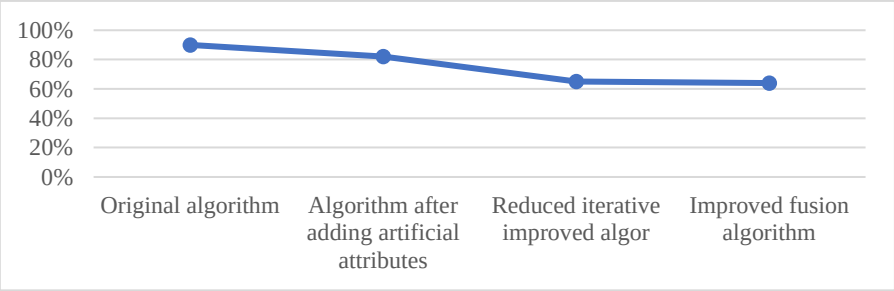


Figure 6 Comparison of the accuracy of the improved fusion algorithm with the other algorithms

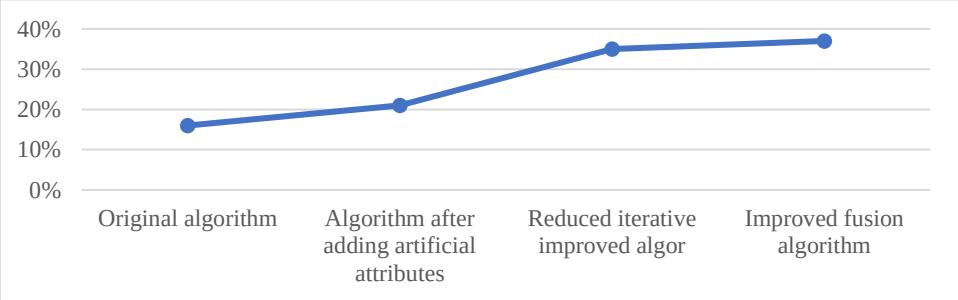


Figure 7 Comparison of the coverage of the improved algorithm and the other algorithms

Under the conditions of limited educational management resources providing student workers with a reference list of students with abnormal learning status can reduce the workload of student workers. Or remind the student workers to pay more attention to those students who have abnormal learning states from the examination results data. Timely personalized learning guidance for these students will help to improve the management efficiency of student workers and the effectiveness of university education.

Through the study, it can be found that more than 80% of the students are satisfied with the teaching system, more than 90% of the students say they can accept the teaching system, and only a few students say they are not satisfied, which fully shows that the system can be recognized by students and has the value and significance of promotion. With the deepening of the reform of the modern education system, modern teaching methods have

been developed rapidly. Campus multimedia integrated teaching network system came into being, it can better integrate existing teaching resources, make up for the shortcomings of traditional teaching mode in intuitive, three-dimensional perception, dynamic feeling, etc., and obtain the effect that traditional teaching methods can not get, which is also the significance of this system research and the focus of campus information construction.

5. CONCLUSION

This study successfully designed and implemented a college student management platform based on embedded neural networks, which demonstrated significant advantages in addressing the complexity and data intensive challenges of modern education systems. By integrating embedded network and data analysis technologies, we have innovatively built a monitoring system that can deeply analyze students' learning status. This not only achieves comprehensive management of students' basic information, but also further expands to accurate identification and prediction of students' learning behavior, learning trends, and even potential learning obstacles. The anomaly detection mechanism embedded in the platform utilizes the powerful capabilities of embedded neural networks to effectively identify students with abnormal learning states, providing educators with timely intervention and personalized guidance, significantly improving the efficiency and scientificity of student management. At the same time, the high-performance database support of the system ensures the rapid processing and efficient management of massive data, meeting the strict requirements of modern education for data processing capabilities.

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