

Retraction

Retracted: Analysis and Application of Data Mining Technology for College English Education Integration

Security and Communication Networks

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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) Manipulated or compromised peer review

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.

In addition, our investigation has also shown that one or more of the following human-subject reporting requirements has not been met in this article: ethical approval by an Institutional Review Board (IRB) committee or equivalent, patient/participant consent to participate, and/or agreement to publish patient/participant details (where relevant).

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] J. Chen, "Analysis and Application of Data Mining Technology for College English Education Integration," *Security and Communication Networks*, vol. 2022, Article ID 6118196, 11 pages, 2022.

Research Article

Analysis and Application of Data Mining Technology for College English Education Integration

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With the development and application of information fusion technology, English education can realize intelligent application under multi-information fusion technology. In view of the low degree of educational informationization and single application of intelligent methods in the process of education, this paper puts forward the application of multi-technology in English education, so as to improve the education level and application skills. Firstly, this paper explains the educational application technology, especially the analysis of decision tree and linear regression method in data mining technology, and puts forward the framework and system structure diagram of English education system. In the experiment, the application of different methods is compared, and the results show that the decision number method has higher weight in weight analysis. According to the situation of different course quantity, 50%–80% of the course workload can be completed under multi-information fusion. However, in the amount of homework completion, most of the personnel can complete the homework, which has a good application effect. In different English majors, different research methods have different educational purposes and different teaching effects. Through the system interface and system performance testing, using the data mining method has better UI test results and shorter test time.

1. Introduction

With the improvement and enhancement of the education system, college English education has been paid more and more attention by schools. Different English education has different students' learning interests. Using computer information technology to improve students' English scores is a successful way to education. No matter the unilateral education of English or the cultivation of talents, teachers have an irreplaceable position and are considered powerful analysts. Exploring the future development plan and planning of education has obviously become a part of educators. In order to establish the optimal experimental planning and analysis results, it is necessary to practice an important working system to realize the good development of education. With the maturity of network technology and the popularization of multimedia in classrooms, compared with the traditional blackboard teaching, it can no longer meet the high-efficiency dissemination of knowledge, so it is an important measure to implement English teaching reform at

present. Reasonable use of computer-related technology has become an effective way for people to receive education; while adapting to modern technology, remember to keep the pace of the times of traditional education. It strengthens the integration of computer high-efficiency skills and English education and realizes the practical policy of teaching integration [1]. It discusses the application of computer technology in college English classroom teaching and gives corresponding solutions according to our own teaching experience [2]. The data index of the integration degree of information technology and foreign language teaching in different periods is experimented, which proves the deep blending between them with the changes of the times [3]. Through flexible and effective teaching methods, students' learning enthusiasm can be mobilized and their autonomous learning ability can be cultivated [4]. It describes the effective dissemination of educational knowledge by teachers in class and puts forward the effective understanding of knowledge by students, which is the key problem of today's education system [5]. It promotes the modernization of college English

education and constructs a systematic English curriculum system [6]. It analyzes the internal causes and functions of landmark achievements in each period and points out the main problems and contradictions in each period [7]. It triggered the reconfiguration and combination of time and space in traditional classroom teaching and changed the structure of traditional classroom teaching [8]. Accurately grasp the deficiency of English writing ability and adjust and remedy it in time, so as to organically realize the purpose of promoting learning by evaluation [9]. It discusses that teaching begins with meaning inquiry and that teaching should pay equal attention to standardization and innovation [10]. It analyzes the common types of translation problems that still exist at present and puts forward relevant improvement strategies [11]. It shows that there are obvious differences in the meanings of English words and sentences expressed in different articles and explains the meanings in them [12]. Combined with the teaching examples of college English reading and writing, this paper expounds the theoretical characteristics and application of the above stages [13]. With the help of classroom to collect students' growth data to realize multiple evaluation and data analysis, it is convenient for teachers to analyze the weak points of students and take corresponding improvement measures [14]. Based on the Small Private Online Course (SPOC) model, the construction of college English flip classroom teaching practice model can provide good support for college English teaching reform [15].

2. Integration Method of Information Technology and English Curriculum

2.1. Information Technology Fusion Method. In the face of the optimization and trend of English education, both teachers and students play an important role. It not only innovates teaching methods but also optimizes teachers' curriculum design and improves teaching efficiency. It promotes the leading role of teachers in classroom teaching. Integrating information technology into English education industry not only enhances it, improves the efficiency of knowledge exchange between students and teachers, and significantly improves the performance of teaching tasks but also enriches the teaching content. The teaching practice is tutored by using systematic tools and experimental methods, which makes students have reverse thinking in all aspects when thinking about problems in the critical period of information education.

2.1.1. Kalman Filter Algorithm. It is described by linear stochastic differential equation [16], as shown in the following formula:

$$X(k) = AX(k-1) + BU(k) + W(k). \quad (1)$$

Formula (2) is as follows:

$$Z(k) = HX(k) + V(k). \quad (2)$$

At time k , $X(k)$ represents the system state; $U(k)$ represents the system control quantity; and $Z(k)$ represents

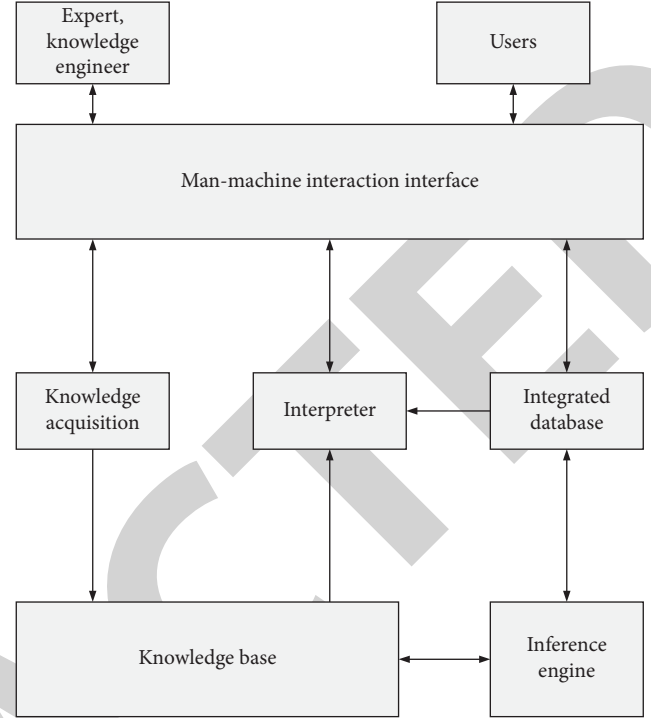


FIGURE 1: System flowchart.

measurement. Among them, the system parameters are A , B , and H ; the covariance is Q , R . $W(k)$ is process noise and $V(k)$ is measurement noise.

K is used for predicting the state of the system, as shown in the following formula:

$$X(k|k-1) = AX(k-1|k-1) + BU(k). \quad (3)$$

Calculate the covariance p , as shown in the following formula:

$$P(k|k-1) = AP(k-1|k-1)A' + Q. \quad (4)$$

An optimized estimate $X(k|k)$ of the state $Z(k)$ is calculated:

$$X(k|k) = X(k|k-1) + Kg(k)(Z(k) - HX(k|k-1)). \quad (5)$$

Kg is Kalman gain [17].

$$Kg(k) = \frac{P(k|k-1)H}{(HP(k|k-1)H + R)}. \quad (6)$$

Realize the update covariance of $X(k|k)$ in k state, as shown in the following formula:

$$P(k|k) = (I - Kg(k)H)P(k|k-1). \quad (7)$$

2.1.2. Expert System Method. The expert system method is shown in Figure 1.

In Figure 1, the user inputs the corresponding requirements through the human-computer interaction interface, and the system selects the corresponding

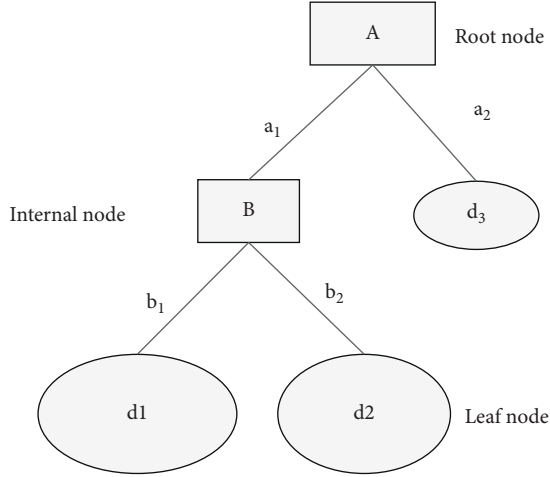


FIGURE 2: Concept diagram of decision tree.

interactive knowledge base for query according to the user input to obtain the corresponding results. The basic process of the expert system method [18]. is to face the questions put forward by the system from the user, and then to match and upgrade the information after processing, and then to match and store it in the comprehensive database. Finally, the expert system presents the final conclusion to the user.

2.2. The Best Scheme of Matching Information Technology with English Education

2.2.1. Decision Tree Learning Algorithm. Decision Tree [19]. Decision tree is an efficient optimization and decision-making method. The judgment is made from the internal node to the output of the branch result. Finally, each leaf node represents the result of a classification, as shown in Figure 2.

The characteristics of decision tree method are information entropy, information gain, information gain rate, and *Gini* index.

The decision tree process is shown in Figure3.

Entropy [20]:

$$P(X = x_i) = p_i, \quad i = 1, 2, \dots, n. \quad (8)$$

Then, the entropy of random variable X is defined as

$$H(X) = - \sum_{i=1}^n p_i \log p_i. \quad (9)$$

The greater the entropy, the greater the uncertainty of random variables. The distribution of X when values are 1 and 0 is

$$P(X = 1) = p, P(X = 0) = 1 - p, 0 \leq p \leq 1. \quad (10)$$

The entropy is

$$H(p) = -p \log_2 p - (1 - p) \log_2 (1 - p). \quad (11)$$

Conditional entropy [21]:

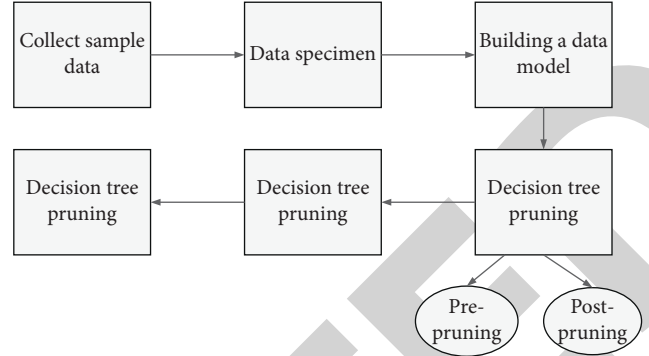


FIGURE 3: Process flowchart of decision tree algorithm.

$$H(Y | X) = \sum_{i=1}^n p_i H(Y | X = x_i). \quad (12)$$

Ask anonymously: $p_i = P(X = x_i)$, $i = 1, 2, \dots, n$.
Information gain [22]:

$$g(D, A) = H(D) - H(D | A). \quad (13)$$

Algorithm of information gain:

(1) Calculate the entropy of the dataset:

$$H(D) = - \sum_k \frac{|C_k|}{|D|} \log_2 \frac{|C_k|}{|D|}. \quad (14)$$

(2) Calculate the conditional entropy $H(D|A)$:

$$H(D | A) = \sum_{i=1}^n \frac{|D_i|}{|D|} H(D_i) = - \sum_{i=1}^n \frac{|D_i|}{|D|} \sum_{k=1}^K \frac{|D_{ik}|}{|D_i|} \log_2 \frac{|D_{ik}|}{|D_i|}. \quad (15)$$

(3) Calculate the information gain:

$$g(D, A) = H(D) - H(D | A). \quad (16)$$

Information gain rate:

$$g_R(D | A) = \frac{g(D, A)}{H_A(D)}. \quad (17)$$

Gini index [23]:

$$Gini(p) = \sum_{k=1}^K p_k (1 - p_k) = 1 - \sum_{k=1}^K p_k^2,$$

$$D_1 = \{(x, y) \in D | A(x) = a\}, \quad (18)$$

$$D_2 = D - D_1,$$

$$Gini(|D| A = a) = \frac{|D_1|}{|D|} Gini(D_1) + \frac{|D_2|}{|D|} Gini(D_2).$$

Regression tree [24]:

$$\sum_{x_i \in R_m} (y_i - f(x_i))^2, \quad (19)$$

where $f(x_i)$ is a predicted value for each division unit.

$$f(x_i) = c_m = aue(y_i | x_i \in R_m). \quad (20)$$

The summation formula is

$$\min_{j,s} \left[\min_{c_1} \sum_{x_i \in R_1(j,s)} (y_i - c_1)^2 + \min_{c_2} \sum_{x_i \in R_2(j,s)} (y_i - c_2)^2 \right]. \quad (21)$$

2.2.2. *Data Mining Technology.* Linear regression [8]:

$$\hat{w} = (X^T X)^{-1} X^T y. \quad (22)$$

Parameter evaluates to the following expression:

$$\hat{w} = (X^W X)^{-1} X^W y. \quad (23)$$

The optimization formula is defined as follows:

$$\text{Fit } \theta \text{ to minimize } \sum iw^{(i)} (y^{(i)} - \theta^T x^{(i)})^2, \quad (24)$$

Output $\theta^T x$.

3. Research on Information-Based Education Integration

3.1. Research Method

3.1.1. *Literature Analysis.* Collect information and read related books, periodicals, and corresponding documents. Reach a solution to the problem according to your own needs. Among them, finding the corresponding research results according to the mastered forecasting needs is to lay the foundation of the basic theory and have a basis for the cycle method.

3.1.2. *Content Analysis.* Content analysis method will use characteristic evaluation method to realize the most valuable reasoning and analysis when making meaningful article content evaluation. The original text form has been unable to satisfy the powerful interpretation of the text, so the content analysis method to make full use of the text has become an important document analysis method.

3.1.3. *Interview Method.* It is easy to understand that interviews refer to face-to-face communication between people to achieve the purpose of disseminating information and reaching consensus. From the psychological judgment of different groups of people, we can meet the needs of both sides, which is convenient for observation and judgment in the later period. Understand how people respond to problems.

3.1.4. *Statistical Analysis of Data.* Data statistical analysis method is to calculate and analyze all kinds of data through corresponding mathematical methods and finally achieve experimental results. Facing the situation of optimization

and improvement in the education industry, it is necessary to make a standard education framework to achieve high efficiency and accuracy of education.

3.2. *System Requirement Analysis.* According to the key training of English education in schools and the key construction plan of the national education system, a computer information management system will be developed to change the teaching mode. Through the coverage and popularization of school education network, it is convenient to enter the campus network at any time, which can increase the rapidity of students' education. Sharing network resources is to improve students' learning ability and reform teaching.

In college English education, some students' basic English ability is weak, and their comprehensive English quality level is not high. According to the difference of English mastery level of poor students and excellent students, teachers can carry out some regional and key education methods to teach. Self-regulated learning and timely strengthening of interest in English subjects are good qualities for students to perform in improving their grades, and they have indispensable spiritual qualities for realizing English education.

Nowadays, the diversification of college English textbooks and the institutionalization of educational examinations have led to increasing pressure on students to receive comprehensive education. In order to adapt to the change of teaching materials, students and teachers should accept traditional culture and supplement their cognition of new knowledge in time. In the face of English problems and difficult problems, we should have unique and intensive practice skills and methods to solve the problems.

3.3. *System Technical Architecture.* Using data extraction technology to judge the level of students' information will realize the process reengineering of educational network, as shown in Figure 4.

First, the input basic information of students is inserted into the dataset, and the initial data sample set is processed and analyzed. The content of the dataset is clearer to meet the requirements of qualified data samples. The qualified data sample set should be divided into two parts, one is the training dataset, and the other is the test dataset. Both of them use C5.0 classification algorithm to mine and analyze data to build a basic decision tree, so as to achieve the expected judgment of experimental standards. If a good decision tree can be built, the classification principle of text data can be realized, and students' grades can be evaluated. Such a planning flowchart greatly realizes teachers' friendly analysis of students' grades and makes corresponding teaching changes.

The realization of the framework of modern education system has a predictive experiment on curriculum arrangement, which can reflect the importance of students' English education. The overall framework design of the curriculum is shown in Figure 5.

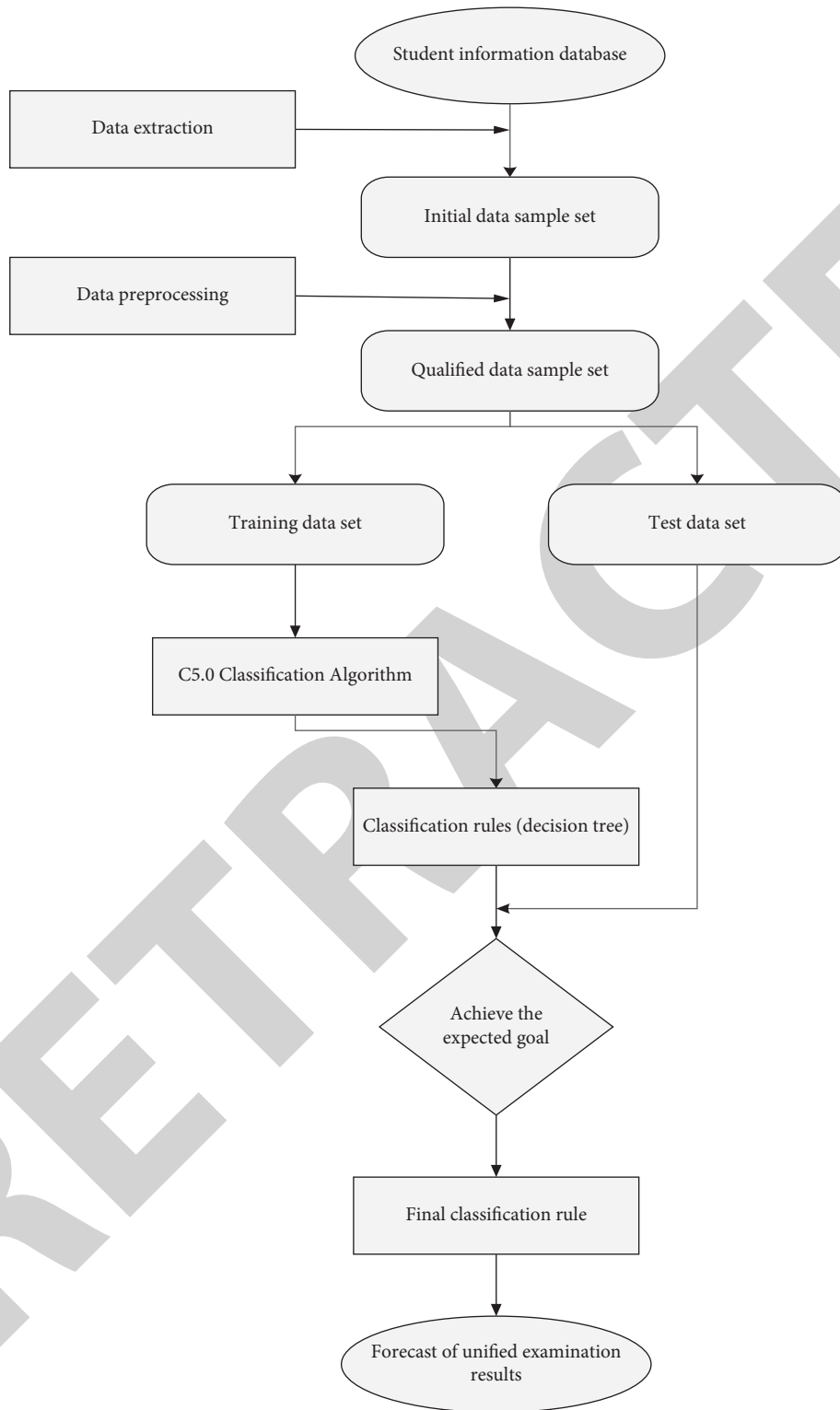


FIGURE 4: Flowchart of English achievement prediction.

When the system prompts, the user can make corresponding actions and provide feedback to the system. In the performance prediction interface, the user will be evaluated and judged according to the prediction results.

The logic layer mainly deals with the business of the system, including user management, data management, and

other basic information management contents. This stage is the main core stage, which plays a key role in reusing performance prediction and plays an important transitional part.

According to the teaching task and teaching arrangement, the processing layer inputs and stores the data, which

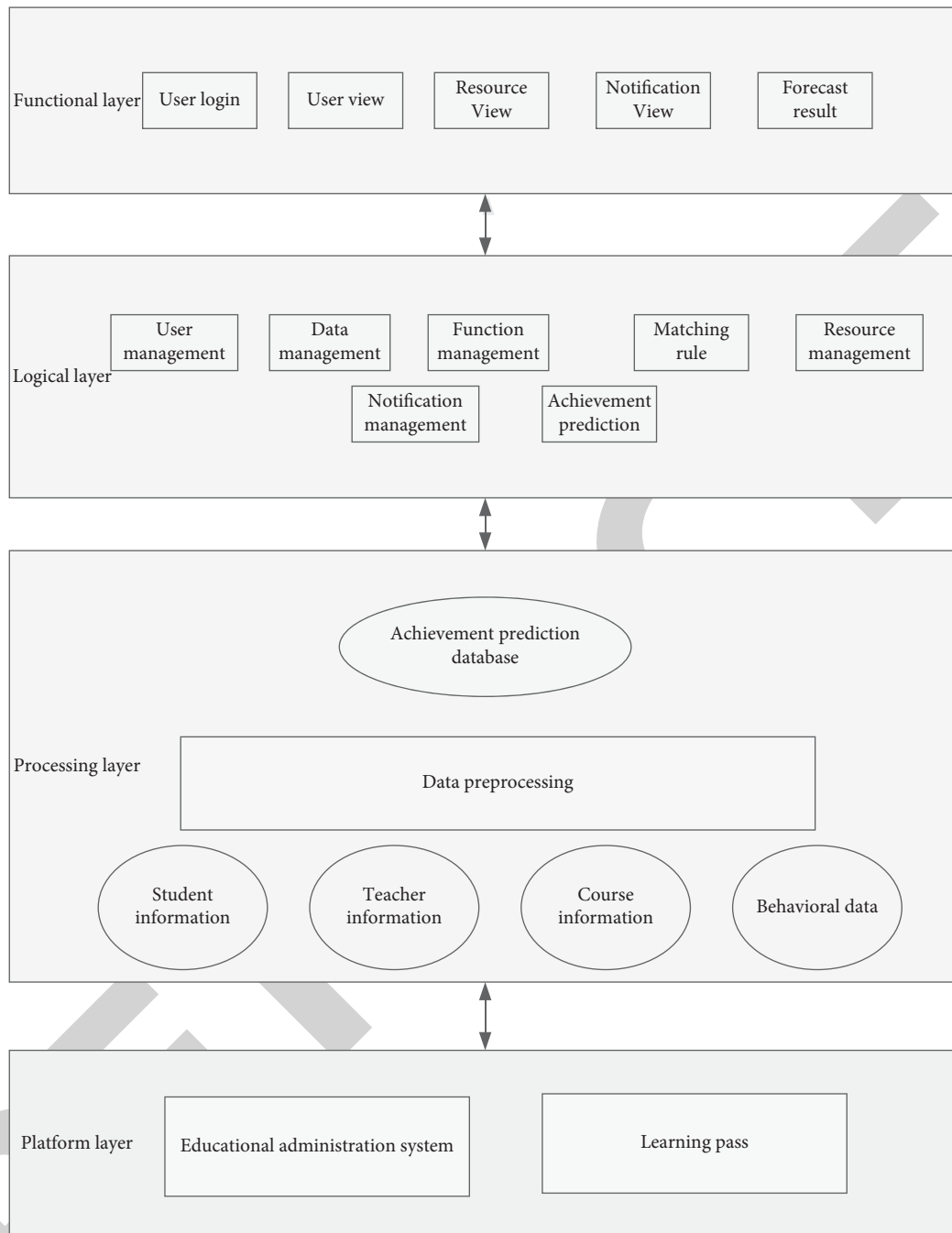


FIGURE 5: System architecture framework diagram.

is convenient to preprocess the analysis information of the corresponding modules in the database. At this level, the information processing will strengthen the rationalization and practice of data to achieve the perfect embodiment of information data.

Students mine and explore data according to their needs to realize basic research and achieve the educational system concept of educational administration and students.

3.4. System Function Analysis. According to the teacher's education guidance system for students, make corresponding information combination to achieve appropriate education process. At the same time, according to the different ideological systems of teachers and students, we find experts to analyze and judge and finally realize the systematic idea of process reengineering, as shown in Figure 6.

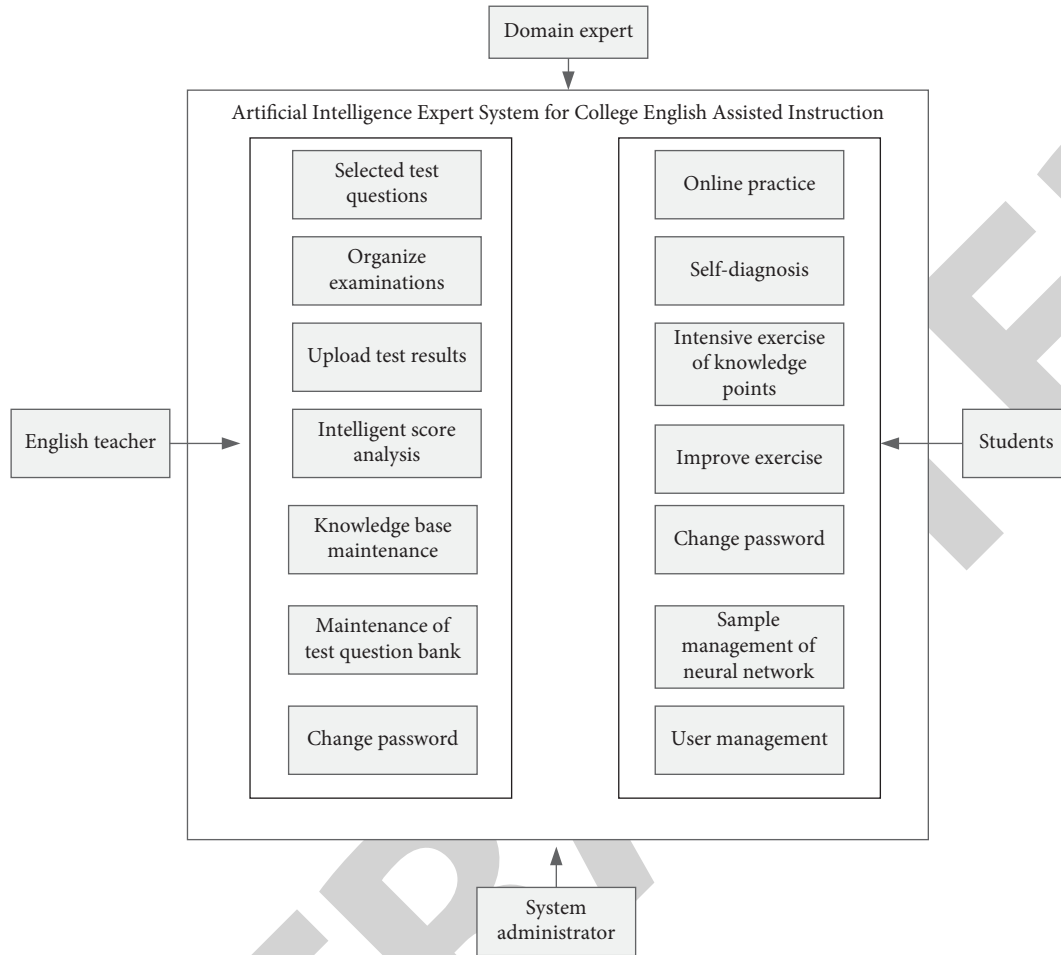


FIGURE 6: Overall structure of the system.

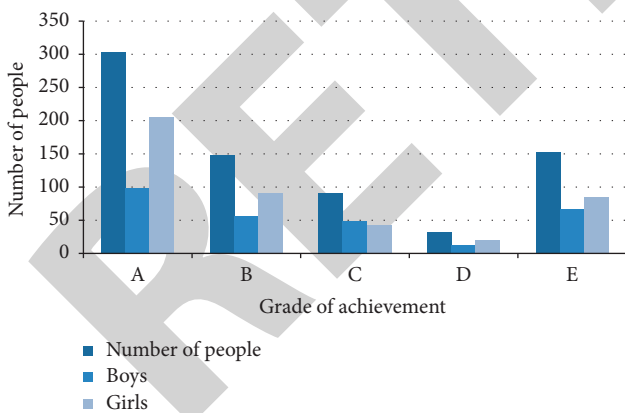


FIGURE 7: Distribution of male and female scores in five grades A-E.

Among them, the reasonable grasp of the test content in the English teacher system determines the trend of students' English scores, and the awareness of students' autonomous learning determines whether their English scores need to be improved. The system administrator has reasonable control over teachers, students, and domain experts and can control the trend of the question bank in time and notify the corresponding personnel to modify and perform other

measures. Domain experts can analyze the vocabulary and knowledge points in English test questions, influence the educational content of English teachers, and put forward teaching experience.

4. An Experimental Analysis Based on College English Education

4.1. Analysis of Male and Female Distribution of Students' English Scores in A-E Grades in Decision Tree. From Figure 7, we can see the perspective of gender. The overall passing rate of female students is as high as 80.66%, while that of male students is only 76.33%, which shows that male students are inferior to female students in learning English.

4.2. Number of A-E Grades Given by Teachers in Decision-Making Method. The number of students who pass the English test in the class taught by different lecturers will have a fundamental influence on teachers' teaching content and teaching attitude, as shown in Figure 8.

After chart analysis, the pass rate of Lecturer 1 is 99%, Lecturer 2 is 87%, Lecturer 3 is 78%, Lecturer 4 is 92%, Lecturer 5 is 68% and Lecturer 6 is 59%.

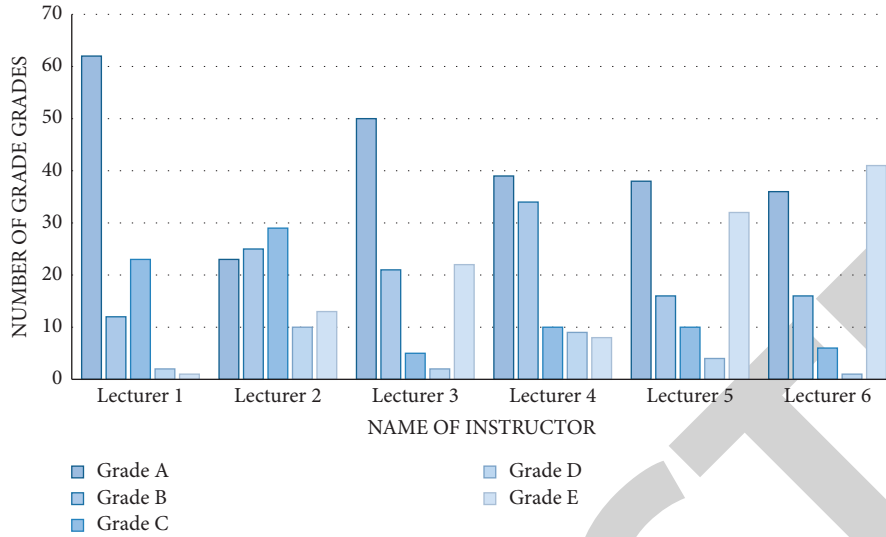


FIGURE 8: Distribution of A-E grades in classes taught by lecturers.

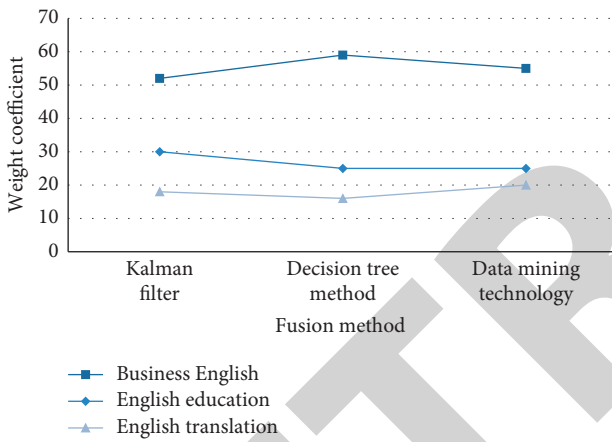


FIGURE 9: Weight ratio of various methods in different specialties.

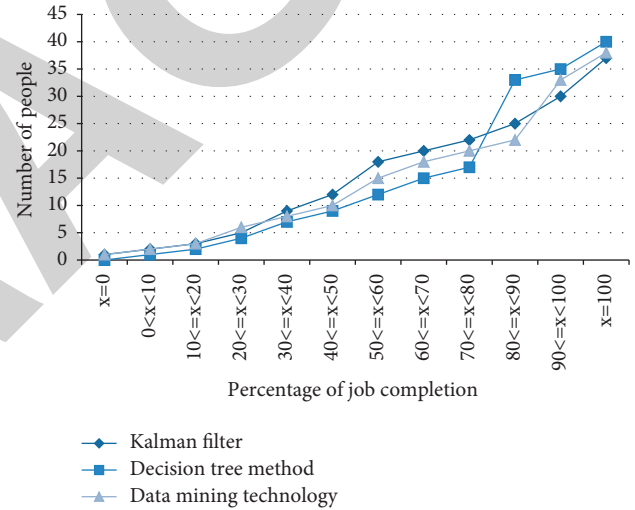


FIGURE 11: Percentage of job completion.

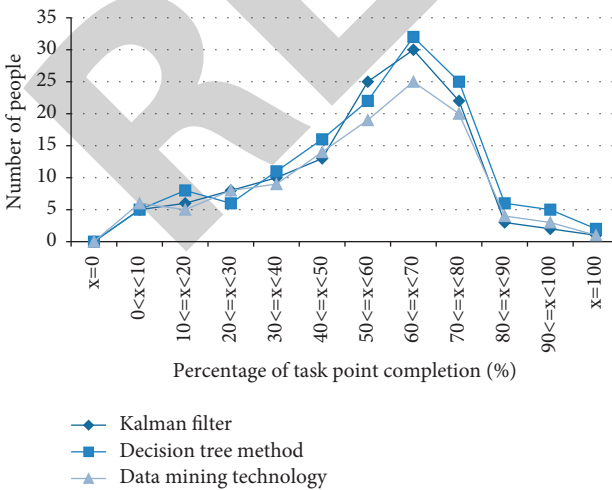


FIGURE 10: Percentage of task point completion.

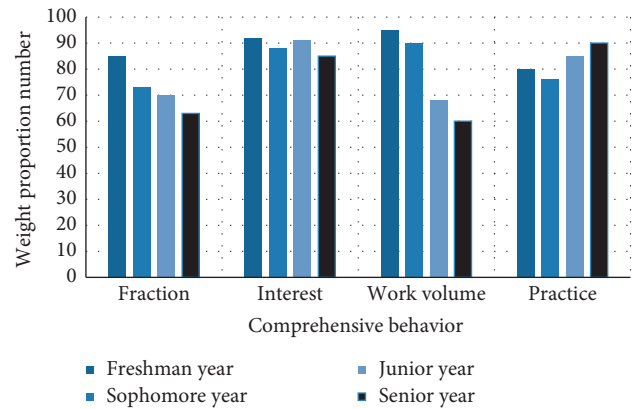


FIGURE 12: Weight ratio index chart of comprehensive analysis of English education from freshman to senior.

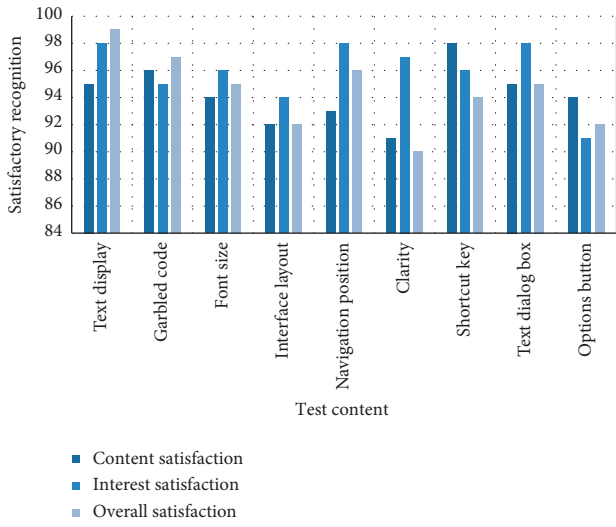


FIGURE 13: UI average satisfaction acceptance.

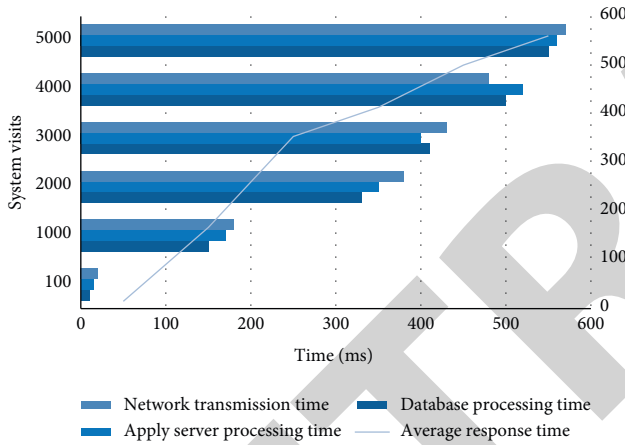


FIGURE 14: Response time distribution of original system.

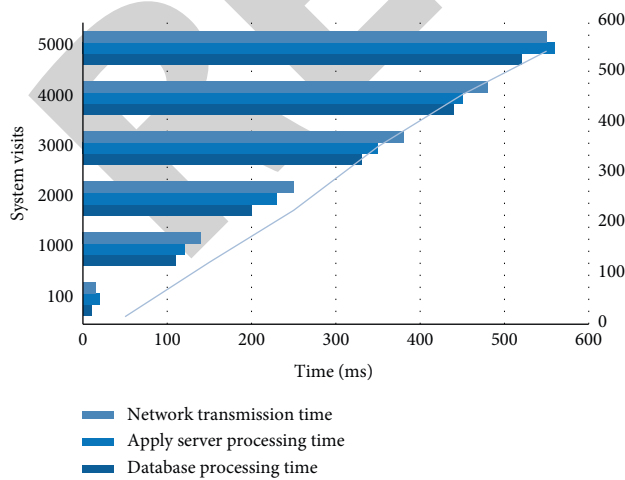


FIGURE 15: New system access response time.

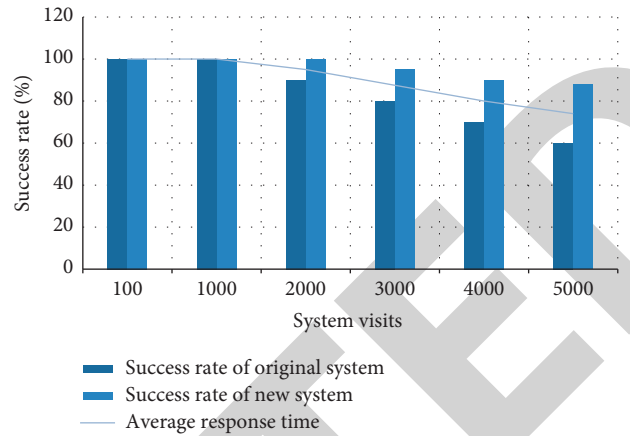


FIGURE 16: Comparative analysis chart of old and new systems.

4.3. Experimental Analysis of Information Technology Fusion. According to the different teaching methods adopted in English majors, the analysis of education level and the embodiment of teaching quality can be realized, as shown in Figure 9.

According to the data analysis, the decision tree method has the highest weight of 59% in business English under the analysis of the weight education results of different English majors. English education only occupies 25% of the weight in the decision tree method. In different English majors, different research methods have different educational purposes and different teaching effects.

4.4. Percentage of English Course Task Points and Assignments Completed. According to the task points assigned by teachers, the number of students who completed the tasks is investigated, and the influence of different methods on teaching quality is analyzed, as shown in Figure 10.

From the above chart, it can be seen that the task point percentage data of the three calculation methods are normally distributed. Among them, the percentage of students completing curriculum tasks is between 50% and 80%, most students have basically completed the study of curriculum tasks, and a few students have completed less than 40% of tasks. Percentage of job completion analysis is shown in Figure 11.

As can be seen from Figure 11, in the case of homework completion percentage, 115 people finished their homework 100%, but 2 people did not finish their homework at all. It greatly reflects the omission of teacher management.

According to the comprehensive analysis of different grades and behaviors, it shows that students' different adaptation and application of English education have different weight proportions, as shown in Figure 12.

It can be seen that from freshman to senior, students concentrate on their work and never pay attention to their studies. Their exam results will decline, and the corresponding homework will also decline. In social practice, senior students will have more opportunities to

communicate and work in English, but it will not be the promotion of interest that will increase the frequency of using English.

4.5. System Performance Test

4.5.1. *Test Environment.* The system test environment includes basic hardware and software testing.

Hardware environment: CPU, memory, hard disk, network card.

Software environment: operating system, running environment, and database.

Computers have different capabilities and software to run in environments where the quality of the hard disk meets the public's requirements for the basic performance of the computer, such as the display of text and other basic operating streams.

4.5.2. *UI Testing.* Although all the UI tests have passed in the user experience, there are great differences in different areas due to the strong autonomy of different students and teachers. There are also differences in satisfaction with different contents, among which the overall average satisfaction is 95%, while there are obvious differences in satisfaction with content and interest. The details are shown in Figure 13.

4.5.3. *Response Time.* It will be categorized according to the number of visits to the system, with six groups of 100, 1000, 2000, 3000, 4000, and 5000, and the response time of the original system and the new system will be compared. Through data analysis, we know that the response time of the new system is 57% lower than that of the original system, which is based on the fact that the response time of the original system is 161 ms while that of the new system is only 91 ms, which greatly reduces the working time and has a 100% success rate. The specific situation is shown in Figures 14–16.

5. Conclusion

In order to cultivate students' autonomous learning ability and teachers' teaching methods with different students' interests in learning English, great attention should be paid and effective changes should be made. At the same time, according to the changes of education system in the past decades, the importance of education development and the powerful information technology have greatly increased students' interest in education. It not only lightens the burden of teachers on teaching tasks but also promotes students' serious learning attitude towards English. In the face of the diversification of education industry and the substitution of teachers in the middle, students should strengthen their own exercise and rely on their solid basic skills to fully adapt to the variability of the environment. In order to strengthen the deep-rooted education in the student

age, from grasping the details to analyzing and explaining all aspects is a good beginning of learning quality. Computer education in universities and English majors have achieved all-round coverage; in the future, it will make great contributions to the effective cultivation of education.

Further research work shall mainly focus on the integrated application and processing of English multi-platforms, for example, the collaborative translation of the results of translation system and big data mining system. Using big data mining technology to match the better translation results of application scenarios on the Internet can effectively improve the translation accuracy in different contexts.

Data Availability

The experimental data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that there are no conflicts of interest.

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