



Enterprise Strategic Financing Risk Management Auxiliary Education System Based on Data Mining

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Abstract. In order to ensure the use effect of enterprise strategic financing risk management auxiliary education system, an enterprise strategic financing risk management auxiliary education system based on data mining is designed. By designing the system hardware structure, combined with data mining algorithm, optimize the functional structure of the system software, simplify the auxiliary education process of enterprise strategic financing risk management, and realize the auxiliary education of enterprise strategic financing risk management. Through the analysis of the system test results, it can be seen that the enterprise strategic financing risk management auxiliary education system based on data mining has high practicability and fully meets the user experience in the process of practical application.

Keywords: Data mining · Enterprise strategic financing · Risk management · Supplementary education system

1 Introduction

At present, the competition of various enterprises is becoming increasingly fierce, and their requirements for the management of enterprise strategic financing are becoming higher and higher, which also puts forward higher requirements for the professional practitioners related to enterprise strategic financing. The conventional teaching mode can not meet the current development needs, so it is necessary to adjust and improve the teaching methods. Using data mining virtual business social environment teaching system is a better way, which can effectively simulate the units and posts in the real business social environment. Students can learn and train in this virtual environment, and learn the contents and work characteristics of each position, so as to improve their learning and execution ability, improve their overall awareness and vocational skills, and then improve students' learning interest and professional skills, so as to lay a foundation

for future practical work. As for the teaching of enterprise strategic financing management in colleges and universities, it mainly includes theoretical teaching and auxiliary teaching, which involves the collection, analysis and processing of a large number of enterprise strategic financing data. The traditional data information processing method is not only inefficient, but also has poor processing quality due to human errors. Therefore, the effective application of data mining processing method in college teaching is very important [2]. Li minglun [1] proposed to put the safety education of college students in front, built a set of safety knowledge question base based on recommendation algorithm, and developed a practical online learning and testing system of safety knowledge. This method can effectively improve the safety awareness of college students. However, with the increase of the number of students, the response time of the system is long and can not meet the needs of more users.

The enterprise strategic financing risk management auxiliary education system based on data mining combines advanced teaching ideas and enterprise management methods, optimizes the functional modules and business of the system, and designs a system that can provide students with a real internship environment. And achieve high consistency in the enterprise strategic financing environment. In this way, interns can really understand the whole process of enterprise organization and management. The use of enterprise strategic financing risk system has significantly improved the training effect, education and teaching level and information level. It can be directly applied to the teaching of enterprise strategic financing management. At the same time, the training of other majors also has strong reference significance.

2 Enterprise Strategic Financing Risk Management Auxiliary Education System Based on Data Mining

2.1 Hardware Structure of Auxiliary Education System for Financing Risk Management

The construction of resource bank in the auxiliary education system of financing risk management is different from the construction of online courses, mainly for small mobile learning terminals [2]. Therefore, when developing courseware applied in mobile learning, we should pay attention to this factor. First of all, the courseware needs to consider the size, followed by the choice of granularity. Thirdly, the theme is clear and can stimulate interest [3]. However, it does not mean the repeated construction of the online course resources on the original Internet. In fact, the educational resources developed based on learning objects can undoubtedly play a great role here. The mode structure of the current mobile learning system is shown in Fig. 1.

With the advent of 5g network era, the further optimization of wireless internet speed and wireless network security, the further price reduction of various access wireless network terminal equipment and the reduction of wireless internet charges will inevitably promote a new round of mobile learning boom. Therefore, the extended mobile examination and mobile incentive will also highlight its greater application advantages with the in-depth research of mobile learning [4]. All walks of life are constantly applying computer software to improve the efficiency of production and work, and the investment

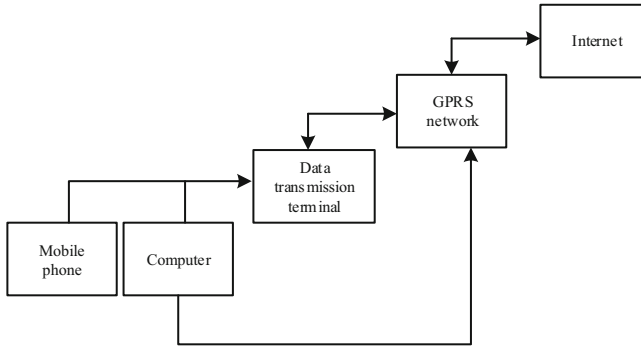


Fig. 1. Model structure of mobile learning system

in the development and use of enterprise strategic financing risk management auxiliary education system is also increasing. The development of enterprise strategic financing risk management auxiliary education system continues to produce new technologies from the earliest static page to dynamic page, so as to better meet the needs of enterprises for the system [5]. The emergence of Java EE provides a lot of middleware for software development, which can better reduce the cost of software development and maintenance. At the same time, JavaEE also supports technologies such as JsP and Java Servlets, and further optimizes the system application architecture based on this, as shown in Fig. 2.

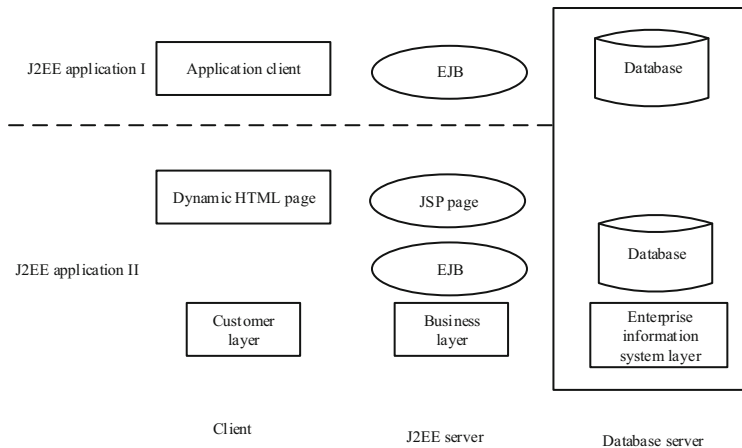


Fig. 2. System application architecture

The teaching system of enterprise strategic financing management based on data mining contains a comprehensive business process. According to the actual situation, after fully investigating teachers, students and various departments involved in teaching, sort out and form functional requirements, including data entry, modification, query, generation and so on. The system provides a visual window and has a powerful function

of data query [6]. The development system of enterprise strategic financing risk system adopts Windows2007 and above operating system, XP operating system, the server side adopts ux server, and uses Myeclipse as the background development tool. Through the collection and analysis of remote connection, the goal of auxiliary teaching is achieved. During the course of enterprise strategic financing risk teaching, students log into the virtual instrument control interface from the warehousing of the network system, and through corresponding operations on the PC, the D/A converter converts the operation information into analog signals. That is, the digital signal is converted into an analog signal, and the controller performs corresponding operations on the physical instruments to complete the operation of assisting the teaching of corporate strategic financing risks. Then the sensor will convert the analog signal to the digital signal through the AD converter for the operation result of the auxiliary teaching of enterprise strategic financing risk, and then display the operation result on the PC. In this way, the auxiliary teaching of physical equipment is completed. The hardware structure of the enterprise strategic financing risk auxiliary teaching system is shown in Fig. 3.

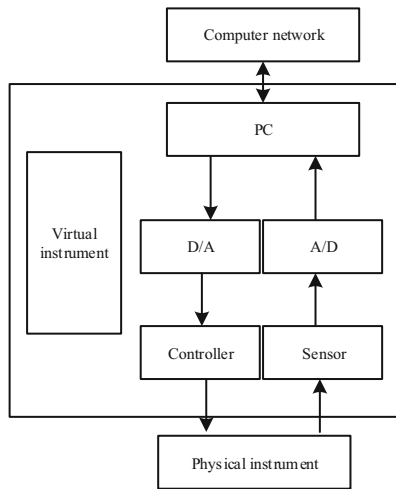


Fig. 3. System hardware structure optimization

Students can access a large number of teaching resources of corporate strategic financing management through computers and mobile Internet. Among them, the lack of practical textual research and lack of scientific basis for the auxiliary learning materials of corporate strategic financing management, once students come into contact with such teaching resources, it is very easy to make learning mistakes. The main reason for this problem is that the teaching managers of corporate strategic financing risk in colleges and universities and the teaching teachers of corporate strategic financing management have not been able to effectively classify the resources on the campus learning network system, which directly leads to the fact that the actual corporate strategic financing teaching resources are relatively low dispersion. The lack of systematicness makes it difficult for students to form a systematic professional knowledge structure of corporate

strategic financing management in the actual learning and utilization process, which naturally greatly reduces the overall quality and efficiency of the teaching of corporate strategic financing management in colleges and universities.

2.2 System Software Function Optimization

In data mining, the research problem of corporate strategic financing risk early warning is positioned as a classification problem, and its goal is to classify different listed companies through the analysis of corporate strategic financing indicators, so as to give early warning. Therefore, this paper uses the technology in data mining to predict the listed company to get whether the company may have a corporate strategic financing crisis, and finally select the optimal model through comparison [7]. The use of the enterprise strategic financing risk management auxiliary education system to establish the learning knowledge points, and the combination of the curriculum knowledge material resources and the enterprise strategic financing risk management auxiliary education system can ensure its long-term use and continuous updating. A course teaching system based on data mining for virtual business social enterprise strategic financing management specialty [8]. Carry out the teaching course construction of virtual business society practice enterprise strategic financing management, and formulate the course construction plan according to the professional talent training plan; The second is to formulate an appropriate curriculum implementation plan; Based on the current teaching management system, combine the curriculum construction and implementation scheme, and form a reasonable syllabus. Finally, mobilize the resources and links of relevant knowledge points according to the syllabus to carry out each learning unit of auxiliary teaching. Based on the previous system functional requirements, the overall planning of the system is carried out, which is divided into three functional modules: teaching function module, training function module and teaching management function module, as shown in Fig. 4.

In the above four sub modules, the classroom interaction function is initiated by teachers and done by students. Students can timely and effectively ask questions and interact with teachers in the learning process, which is conducive to teachers to find students' deficiencies in class and improve them. Through the course selection function, teachers can establish courses, add course information and manage courses, and modify and delete courses. Through the course selection function, students can add courses to join the study, and obtain credits after completing the corresponding study. The teacher issues the homework and notice, and the students submit the completed homework and get the corresponding evaluation. After the significance test of the index, the dimension of the index is reduced. Principal component analysis integrates many original variables into a few component factors, and replaces the original variables with the newly formed factors for modeling. Assuming that F_m is the component factor formed by the first linear combination of the original variables, the information extracted by each principal component factor of $a_{m1}, a_{m2}, \dots, a_{mn}$ can be measured by variance. The larger the component variance F_m of the principal component factor, the greater the amount of

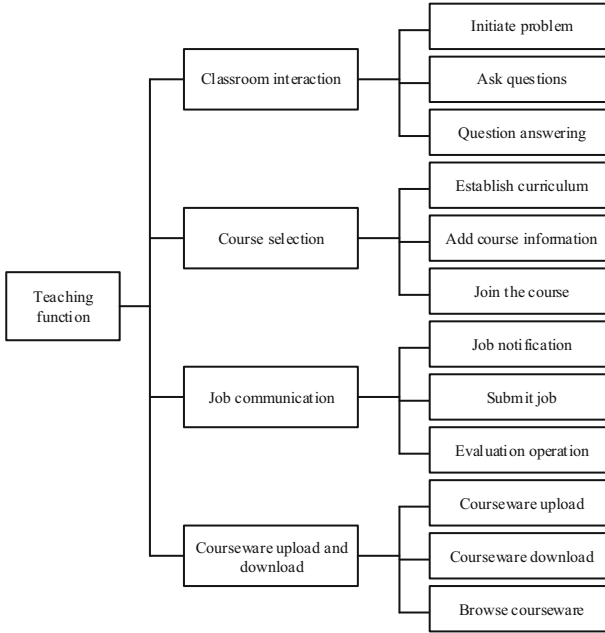


Fig. 4. Functional structure of system software

information contained in F_m . F_m and other principal component factors are independent of each other, where X_n is the n principal components of the original variable. Its relationship is as follows:

$$\begin{cases} F_1 = a_{11}X_1 + a_{12}X_2 + \dots + a_{1n}X_n \\ F_2 = a_{21}X_1 + a_{22}X_2 + \dots + a_{2n}X_n \\ \vdots \\ F_m = a_{m1}X_1 + a_{m2}X_2 + \dots + a_{mn}X_n \end{cases} \quad (1)$$

Taking the establishment of enterprise strategic financing risk early warning model as an example to illustrate the principle of Logistic regression analysis. Set the dependent variable $P_0 = 0$ to represent the company in crisis with corporate strategic financing, and $P_1 = 1$ to represent the company with normal corporate strategic financing. P represents the probability that the $Y = 0$ listed company will have a corporate strategic financing crisis, and $P = 1 - P_1$ represents the probability that the $Y = 1$, the greater the amount of information in principal component factor F_m , the smaller the strategic financing crisis. Listed company will not have a corporate strategic financing crisis:

$$\log(P_1) = F_m - \ln \left[\frac{P_1}{1 - P_0} \right] - \alpha + \beta_k \quad (2)$$

The teaching function of the system provides teachers with the functions of uploading and downloading courseware and timely updating. Teachers can play corresponding

resources during classroom teaching, such as classroom presentation slides, etc. At the same time, teachers can also modify and delete the resource. Students can download and browse, so as to better master the classroom learning content. The sub modules involved in this function module are shown in Table 1.

Table 1. Sub module division

Sub module name	Function description
Classroom interaction	Initiate and ask questions, students participate and solve problems on time
Course selection	Teachers establish courses, add course information, and students join to complete learning tasks
Job communication	Teachers issue assignments and notices, and students submit completed assignments
Courseware upload and download	Teachers pass on materials and students download materials to better master the classroom content

Due to the constraints of network and bandwidth, most of the courseware produced is animation. Because it needs a large amount of storage and is subject to the network bandwidth, it can not be transmitted smoothly, resulting in its low utilization rate and can not be widely used.

2.3 Realization of Enterprise Strategic Financing Risk Management Auxiliary Education

Data mining is a complete and procedural work. This process can mine previously unknown, effective and practical information from large databases, and use this information to make decisions or form rich knowledge. The whole process is in a specific data mining environment. The process of data mining generally consists of three stages: data preparation stage, data mining stage and result interpretation and evaluation stage. The data mining process of enterprise strategic financing information is shown in Fig. 5.

The enterprise strategic financing management simulation system based on data mining is a system under the auxiliary teaching simulation environment of enterprise strategic financing risk management. It is not only the development of general enterprise strategic financing management simulation system, but also takes into account the integration and teaching needs of enterprise strategic financing risk management auxiliary teaching simulation system. Enterprise strategic financing management simulation system is a targeted simulation of the actual enterprise strategic financing management system according to the requirements of teaching. It has all the functions of the enterprise strategic financing management system in the existing enterprise teaching simulation system. At the same time, the enterprise strategic financing budget and cost management module are newly added to make the simulation system more comprehensive in showing the enterprise strategic financing management thought. The functional composition of the

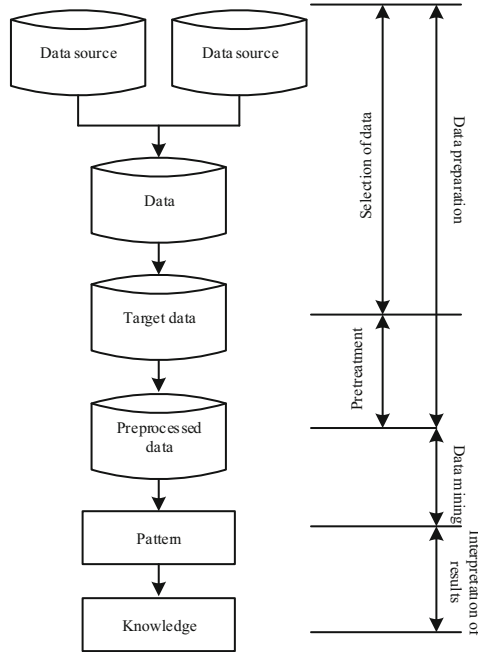


Fig. 5. Data mining process of enterprise strategic financing information

enterprise strategic financing management simulation system based on data mining is shown in Fig. 6.

Among them, the top layer of the diagram is the interface that interacts with users. It constitutes the user presentation layer of the application. It is composed of business process management, web service components and data access components. They provide the implementation of various business rules and business logic for the user presentation layer, and conduct data interaction with various databases by calling data service components. Risk control is the last link of risk management. Risk control shall be carried out according to the results of risk identification, risk analysis and risk evaluation. For better risk control, the results of risk identification, risk analysis and risk evaluation are summarized. The phased results of risk management are shown in Table 2.

The bottom layer of the system is the database, which stores the business data related to the enterprise strategic financing management. Among them, the enterprise strategic financing budget, cost management, accounts receivable management and other modules are internally integrated through data mining, so as to achieve loose coupling of the system and increase the flexibility of the system. The enterprise strategic financing risk management system adopts the service-oriented integration method, and divides the enterprise strategic financing risk management system service into two modules: enterprise strategic financing accounting service and management accounting service. The enterprise strategic financing accounting service module includes general ledger management service, accounts payable management service, cash management service, fixed assets management service and report management service. The services included

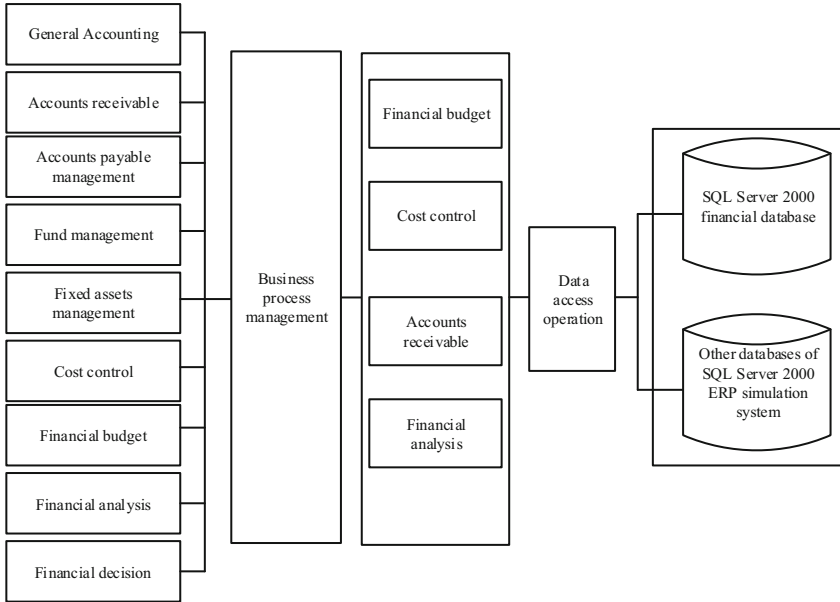


Fig. 6. Functional composition of enterprise strategic financing management simulation system

Table 2. Phased results of risk management

Stage	Achievements
Risk identification	Existing problems: national policies, laws and regulations and internal management of ERP rises
Risk analysis	Bank lending and financing behavior and joint default ratio, pledge ratio, bank supervision cost, etc
Risk evaluation	Among the primary indicators, the top three are: financial, reputation and risk of benefit distribution; Among the secondary indicators, the top five weights are: solvency, financing scale, distribution scheme, administrative penalty and timeliness of delivery

in the management accounting service module include enterprise strategic financing budget service, cost management service, enterprise strategic financing analysis and enterprise strategic financing decision-making service. These modules use the interface provided by web services for mutual data exchange and access. The specific process is shown in Fig. 7.

Based on the analysis and architecture design of enterprise strategic financing risk management system, combined with the hierarchical architecture and overall function of the system, this paper encapsulates the function in the form of service, and designs its granularity. The data mining method is used to analyze and design the services in the enterprise strategic financing management simulation system. When designing services,

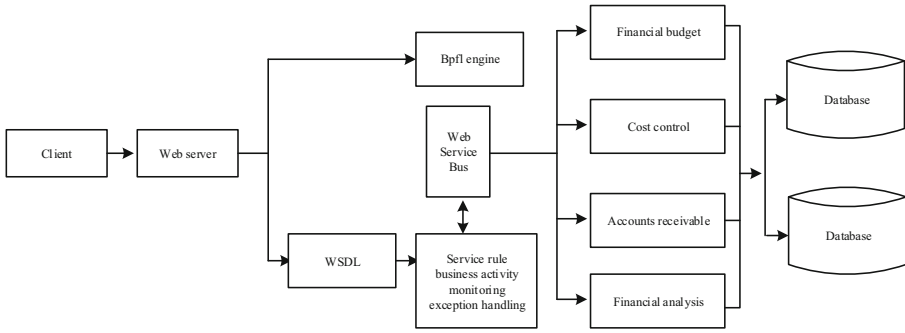


Fig. 7. Data access process of enterprise strategic financing management simulation system

we should follow the principles of business and system function alignment, reusability, statelessness and so on. In the enterprise strategic financing budget module, the budget preparation service, budget adjustment service and budget review service are designed. The budget preparation service is mainly composed of budget adjustment service, budget summary service and budget balance service. In the cost management module, the cost planning service, cost accounting service, cost control service and cost analysis service are designed. The teaching system adopts B / S architecture technology for development, and realizes the interactive function of data from three levels: surface layer, business logic layer and data layer. The first layer is the user layer. Users don't need to care about how the function is realized. Here, they can provide an intuitive, friendly and easy to operate web interface, which can be operated directly according to their own needs; The second layer is the business logic layer, which reflects the realization of corresponding functions through logical judgment; The third layer is the data layer, where the data of the second layer can be extracted and routinely edited, and the upper layer can be fed back at any time. Through the research and development of the three-tier separation principle, the development cost is greatly reduced and the development efficiency is improved. The business function of the financing risk auxiliary management simulation teaching system includes the following three levels. The overall framework structure and function of the system are shown in Fig. 8.

System function module, which is a collection of execution statements, data descriptions and other elements. In the development of enterprise strategic financing risk management system, functional modularization can reduce the workload of system development and reduce the development cost. However, it is not equal to the unrestricted division of enterprise strategic financing risk management system. It requires that each independent module must maintain a certain connection and meet the overall function of enterprise strategic financing risk management system. Therefore, determining the appropriate functional modules will play a decisive role in the success of system development.

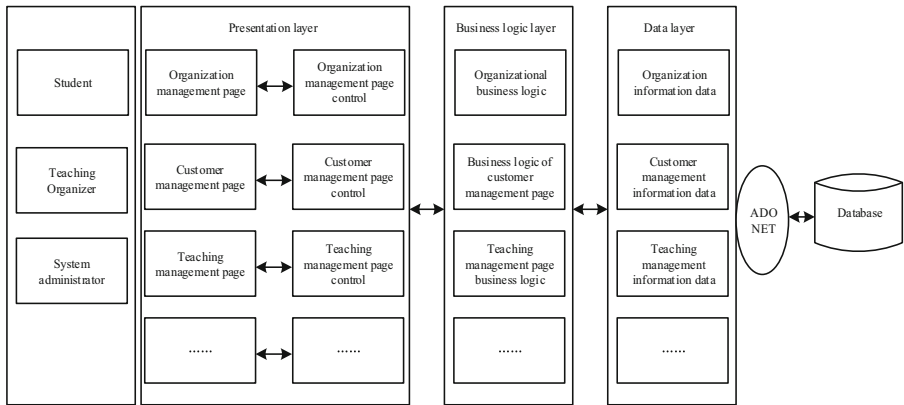


Fig. 8. Overall framework structure and function of the system

3 Analysis of System Test Results

In order to verify the effectiveness of the designed enterprise strategic financing risk management auxiliary education system based on data mining, using windows10 system and Apache server, the functional modules of the enterprise strategic financing risk management system were tested 100 times under the same experimental environment, first explain the test objectives of the enterprise strategic financing risk management system, and then test the functions of each module. The test objectives of the system are shown in Table 3.

Table 3. System functional test objectives

Test scope	Each functional module
Target	Test the errors of each module of the system, modify them pertinently, and make the system achieve the expected function
Process	When the system is operated correctly and valid data is input, each functional module can operate normally; When the operation is wrong, the system will give a response error prompt
Completion criteria	The data output of each functional module of the system meets the expectation

The test cases are designed according to the test content, and the testers need to execute according to the appropriate process. The specific test is shown in Table 4.

Based on the above test contents, its tests can be divided into four categories, such as basic function test, web function test, usability test and other tests. The function test of enterprise strategic financing risk management system is to compare the functions and requirements realized by the enterprise strategic financing risk management system and determine whether they are consistent. For example, whether the training of professional

Table 4. System test cases

Content	Serial number	Operation content	Expected results
Test	A	Administrator login and add course information	Complete the test
	B	Apply for deletion function test	It can be used normally
	C	Teacher login	It can be used normally
	D	Student login	The addition can be completed

courses can be completed according to the user’s authority and processing order, whether the course selection link can be completed smoothly whether students’ grades can be displayed and submitted correctly, etc. Therefore, all the functions of the system are tested according to the needs of users. This paper selects the enterprise strategic financing risk management course information management for the test. The following table is the content of the course information management function test, as shown in Table 5.

Table 5. Contents of course information management test

Test item	User role	Test content
Add course	Administrators	Add professional courses
Course management	Teacher A	Course information management
Course selection information management	Teacher B	Manage course selection information
Add course	Administrators	Manage course selection information
Add course	Student	Manage course selection information

Set test cases for the student sub module to test whether the functions of the student sub module meet the expectations. The test cases include: course selection operation, student achievement and credit query, student status change application, course Q&A and student registration. The function test of enrollment management module is shown in Table 6.

White box testing is also called logic driven testing or structure testing, and its principle is just opposite to black box testing. This test method can regard the test program as an open box. The tester mainly judges whether the enterprise strategic financing risk management system operates according to the established path and method when he has understood its internal structure. The scope of function test is shown in Table 7.

Using the prediction probability and whether the industry defaults as the investigation variables, the ROC curve of the operation of the enterprise strategic financing risk management system is obtained, and the ROC auxiliary management curve is shown in Fig. 9.

Table 6. Function test of enrollment management module

Test no.: ychaign006

Test purpose: does the function of enrollment management module meet the expectations

System role: recruiter

Serial number	Behavior	Expected results	Does it meet expectations
A	Enter the student account, password and select the role "student"	Enter the student welcome interface	Yes
B	Click the directory to select courses	Pop up drop-down menu	Yes
C	Click course to learn	Pop up drop-down menu	Yes
D	Click on the list of grades and credits	Pop up drop-down menu	Yes
E	Click the directory to apply for student status change	Pop up drop-down menu	Yes
F	Click directory personal information		Yes
G	Click any drop-down menu	The management interface pops up	Yes
H	Click register	Enter the registration information interface	Yes

Table 7. Scope of function test

Expected target	Test whether the relevant functional modules of the exhibition management simulation teaching platform can run in different environments
Test scope	Test whether the basic functions of each module are stable
Testing technology	Combination of black box and white box test
Test standard	The R & D of the exhibition management simulation teaching platform has been completed, and a detailed test plan has been formulated to feed back errors in time
Test focus	Exhibition organization, exhibition service, customer management, exhibition management, teaching management

It can be seen from Fig. 9 that the ROC curve is a comprehensive indicator reflecting the sensitivity and specificity of continuous variables. Generally, the area under the ROC curve is between 0 and 1. The closer the area under the ROC curve is to 1, the better the analysis effect. The area under the curve in the figure is 0.763, which is greater than the real area value of 0.5, and its significance is $0.001 < 0.05$. Therefore, it shows that the

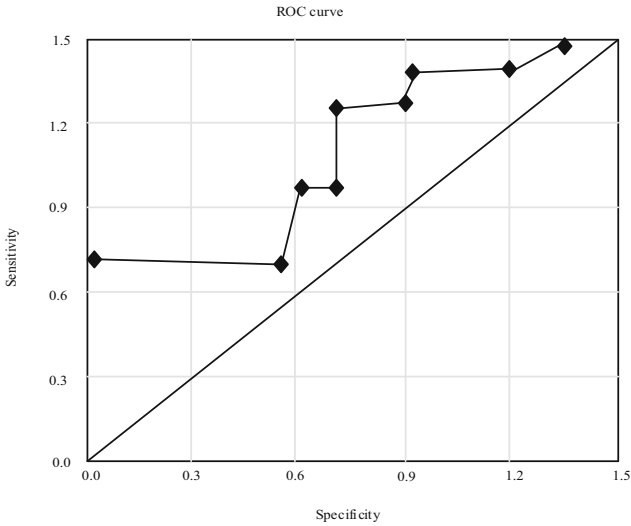


Fig. 9. ROC auxiliary management curve

logistic model can well distinguish financing analysis, and the overall prediction effect of the model is good, so the prediction probability obtained by the model is effective. This paper designs a total of 30 test sub items, and then designs the use cases for each test sub item, which will not be repeated here. The final test proves that the system can be used normally, which can prove that the system basically meets the expected requirements in terms of function realization, the performance can also meet the user experience, and is more appropriate in terms of security and operability.

In order to verify the effectiveness of the proposed method, when the number of users is between 0 and 500, the time taken to test the proposed method and reference [1] is shown in Fig. 10.

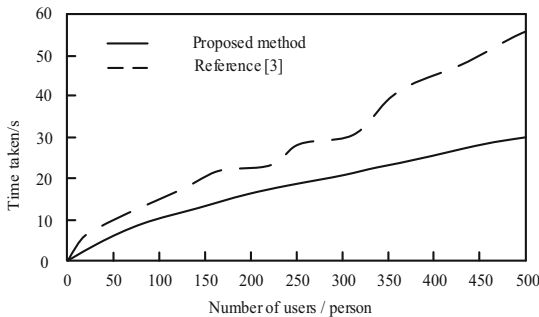


Fig. 10. Time taken to test the proposed method and reference [1]

It can be seen from the results in Fig. 10 that the time taken by the proposed method and reference [1] increases with the increase of the number of users. When the number of

users reaches 500, the time of the proposed method is 30 s, and the time of the reference [1] is 55 s. It can be seen that the proposed method is more efficient and practical, and can fully meet the user experience

4 Conclusion

With the rapid development of China's social economy, the competition between various industries has gradually evolved into the competition of professionals. Enterprise strategic financing management is an indispensable work content in the process of enterprise operation and development. In view of this aspect, this paper selects the appropriate hardware structure according to the size of the courseware, optimizes the system application architecture through JavaEE, and improves the overall quality of teaching. Then the data mining method is used to analyze and design the services in the enterprise strategic financing management simulation system, so as to improve the transmission speed of distance teaching courseware. Based on data mining, the enterprise strategic financing risk management auxiliary education is realized, which reduces the workload of system development and research cost. The system test results show that the proposed method can improve users' learning efficiency and has high practicability.

Fund Project

1. "Qinglan Project" of Jiangsu Universities - Training Project for Outstanding Young Backbone Teachers (RS21QL01).
2. "Excellent Project of Social Science Application Research in Jiangsu Province" - Special Project of Collaborative Innovation Base (22XTB-77).
3. Key Project of the "14th Five-Year Plan" for Educational Science in Jiangsu Province (B/2022/02/44).
4. Provincial and Ministerial Subject Cultivation Project of Wuxi Vocational Institute of Commerce (KJXJ21602).

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