Retraction

Retracted: Design of Higher Education System Based on Artificial Intelligence Technology

Discrete Dynamics in Nature and Society

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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.

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.

References

[1] J. Li, J. Li, Y. Yang, and Z. Ren, "Design of Higher Education System Based on Artificial Intelligence Technology," *Discrete Dynamics in Nature and Society*, vol. 2021, Article ID 3303160, 11 pages, 2021.

Research Article

Design of Higher Education System Based on Artificial Intelligence Technology

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In order to solve the problems of low security and response efficiency and slow running speed of the current designed higher education system, a higher education system based on artificial intelligence technology is designed. Firstly, according to the characteristics of artificial intelligence technology, intelligent teaching system, agent technology, and data mining technology are introduced in detail. Then it analyzes the overall and detailed functional requirements of the system and adaptively generates knowledge content and teaching mode suitable for students' ability and personality by using intelligent reasoning ability and the collection and analysis of students' personality characteristics. Through data mining of intelligent teaching system, the decision tree about curriculum is obtained, and the students' cognitive ability is calculated. Based on the theory of cognitive science, using the "double master" teaching mode, combined with agent technology and intelligent teaching system, the system function is divided into six modules. Through the design of database structure and data table, the design of higher education system based on artificial intelligence technology is realized. The experimental results show that the proposed method has high security and response efficiency, fast running speed, and good teaching effect.

1. Introduction

At present, higher education management has gradually changed into the core component of various colleges and universities. With the gradual deepening of higher education system reform, the traditional higher education management system cannot keep up with the progress of modern education [1–3]. Nowadays, the educational measures of higher education institutions have been gradually implemented, and the source of students in higher education institutions is growing steadily, which brings a greater burden to the teaching management system. How to use computer technology and network technology to serve education more efficiently and conveniently in the field of education has become a new topic faced by higher education institutions [4, 5]. With the development of computer network technology, the impact of Internet technology, information technology, and intelligent use of computers and digital tools is becoming more and more important [6, 7]. The development of these technologies constructs the database and communication technology under the network environment. Today, with the development of campus network, educational administration supervision system has become one of the important means, which provides an important basis for improving the teaching management level and work efficiency of higher education.

At present, the research on higher education system has also made great progress. Reference [8] designed the security management system of Iran higher education center. Through the concept of evaluation theory, determine the sharing points and differences of the evaluation system and develop the initial safety management system of higher education center. Delphi technology is used to verify the safety management system of higher education center. Qualitative data analysis was conducted by agreeing on the views of the reviewed studies and determining their

similarities and differences. This method can effectively improve the performance of these systems. Reference [9] designed the construction and verification of the success scale of learning management system in higher education environment. Use various successful frameworks to design structures. Quantitative methods were used to randomly select response samples from university students, scholars, and curriculum managers. This method can be effectively used by scholars to develop and test other information system related theories. However, the above methods still have the problems of low system security and response efficiency and slow system operation speed. In view of the above problems, a higher education system based on artificial intelligence technology is designed. Based on the development of computer network technology, artificial intelligence technology designs the higher education system. After processing, the operation is simple and easy to understand for teachers and students. Artificial intelligence technology can also ensure that the higher education system will not be interfered by many people in the operation process and only need to run by itself according to the program. Periodic maintenance of equipment can ensure the normal progress of teaching work. The use of artificial intelligence technology can greatly ensure the stability and safety of higher education system. Compared with the above literature system, the innovation of the designed system is to generate knowledge content and teaching mode suitable for students' ability and personality by analyzing the overall and detailed functional requirements of the system and using the intelligent reasoning ability and students' personality characteristics. Using the "double master" teaching mode, combined with agent technology and intelligent teaching system, the system function is divided into six modules to form a multiagent system with multilevel structure. Through the design of database structure and data table, the design of higher education system based on artificial intelligence technology is realized. The design system has high security, high response efficiency, and fast running speed.

2. Artificial Intelligence Technology

Artificial intelligence is a new subject. There are different understandings and definitions of artificial intelligence in different fields. Only when electronic computers can be used to control and process information can their simulation of human thinking be called artificial intelligence [10–12]. At present, the research hotspots in the field of artificial intelligence mainly include intelligent teaching system, agent technology, data mining technology, and so on.

2.1. Intelligent Teaching System. Intelligent tutoring system (ITS) is a kind of effective teaching technology for students based on cognitive science and comprehensively utilizing the technical achievements of artificial intelligence technology, educational psychology, computer science, and other disciplines [13–15]. ITS can intelligently find the hard to find blind spots of students and teachers in learning and teaching and intelligently eliminate the blind spots, which can reduce students' learning burden, improve teachers' teaching efficiency, and finally achieve the purpose of improving students' academic performance. At present, ITS mainly includes teacher module, expert module, student module, and human-computer interaction module. The functions of each module of the system are as follows. The structure of ITS system is as Figure 1.

(1) Teacher module: under the guidance of appropriate teaching strategies, select appropriate teaching contents and present them to students in appropriate forms to show the best guidance and high-level teaching. The teaching module can select the next teaching strategy according to the information in the student module. At the same time, teachers can understand the students' learning progress, learning status, and test results through the system.

(2) Expert module: domain knowledge base is an important part of the knowledge base expert module composed of the specific domain knowledge taught. It stores the teaching domain knowledge and the problem-solving knowledge of teaching experts. ITS function is to organize, store, and manage all knowledge in the teaching field.

(3) Student module: provide various information about students for the teaching module to realize individualized teaching [16]. Student information base is an important part of student module. It records students' basic information, learning methods, knowledge mastery, and so on. The student module uses the student information database to analyze and diagnose students, so that the system can correctly evaluate students' understanding of knowledge.

(4) Human-computer interaction module: it is a component for the system to exchange information with users and complete interaction. Establish a friendly way of information exchange between intelligent teaching system, teachers, and students, and provide an interactive way for the information input and output of other modules.

2.2. Agent Technology. Agent technology refers to a program that simulates human behavior and the relationship between people and can independently run and provide corresponding services according to the perceived environment [17–19]. The basic structure of agent is as shown in Figure 2.

Agent is an active entity of intelligent activities with information processing ability. It should have a perceptron that interacts with the outside world, an information processor that processes and stores information, an effector that reacts on the environment, and a communication mechanism that acts on the inside and outside [20]. At present, the application of agent technology has three aspects: artificial intelligence, computer and information science, and other business fields. In the field of artificial intelligence, many traditional artificial intelligence technologies are combined with agent technology. Generally, agent software has the
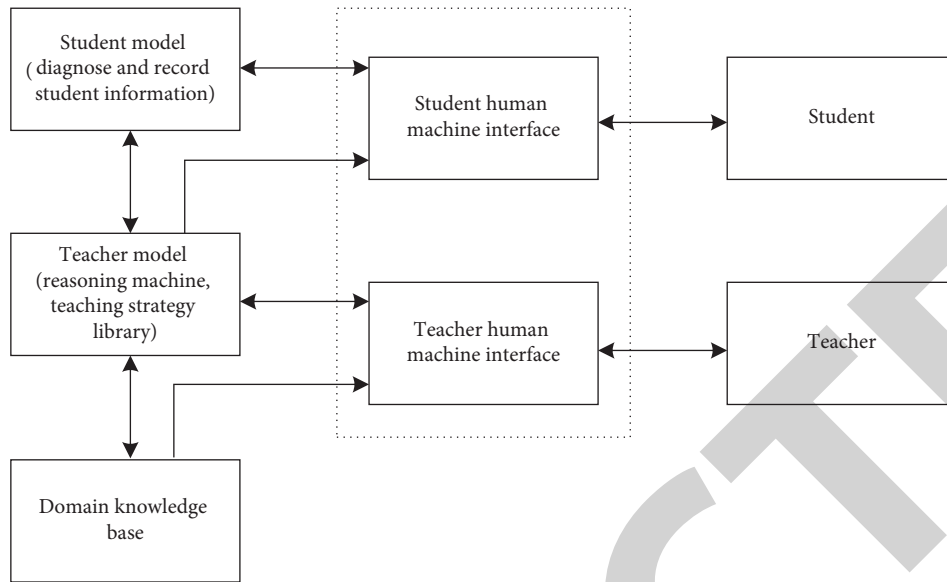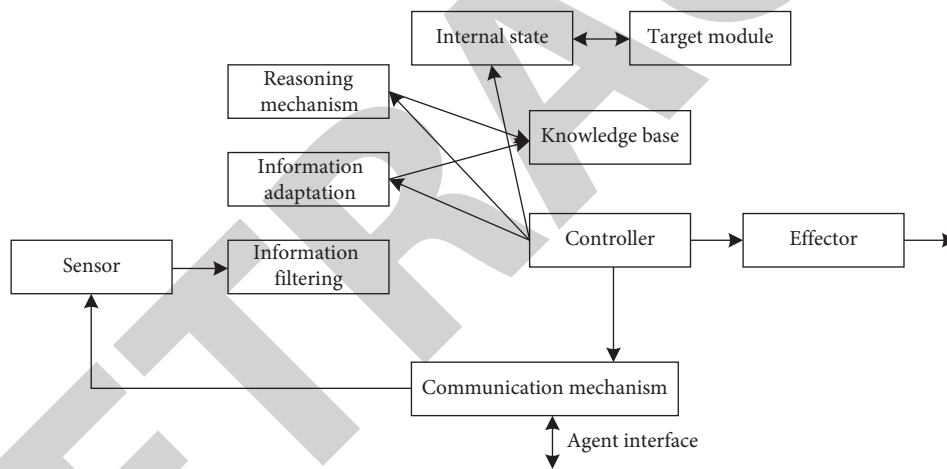
FIGURE 1: ITS system structure.

FIGURE 2: Basic structure of agent.

characteristics of interaction, autonomy, purpose, adaptability, and cooperation.

2.3. Data Mining Technology. Data mining is a computer-aided processing process for finding and analyzing massive data. In this process, patterns that have not been found before are found, and then some connotative information is mined from these data, including information describing the past and predicting future trends [21, 22]. Decision tree is essentially a process of classifying data through a series of rules, mainly based on the attribute values of data. It is an algorithm commonly used in prediction models. It finds some valuable and potential information by purposefully classifying a large number of data [23, 24]. There are two common decision tree methods.

2.3.1. ID3 Algorithm: Uses "Information Gain" as a Metric to Select Classification Attributes. Information gain refers to the effective reduction of desired information or information entropy [25]. The amount of information of event S_i can be measured by the following formula:

$$I(s_i) = p(s_i)\log_2\frac{1}{p(s_i)}. \tag{1}$$

In formula (1), $p(s_i)$ represents the probability of event S_i occurring. The information entropy gain of the attribute is calculated according to the above theory: let S be the set of s sample data. Assuming that the class label attribute has m different values, define m different classes $C_i\,(i = 1, 2, ..., m)$. Let S_i be the number of samples in class C_i; the information entropy required to classify a given sample is expressed as

$$I(s_1, s_2, \ldots, s_m) = -\sum_{i=1}^{m} p_i \log(p_i). \tag{2}$$

In formula (2), p_i is the probability that the sample belongs to C_i, and its value is S_m/S. $I(s_1, s_2, \ldots, s_m)$ is the average uncertainty before the sample is classified.

Suppose that attribute A is the root of the decision tree and has v different values $\{v_1, v_2, \ldots, v_v\}$. In this way, S can be divided into V subsets by attribute A. The number of records contained in each subset is $S_1, S_2, \ldots, S_v$. The number of samples on each classification attribute of the subsample set divided by attribute A is expressed by S_{ij}. The information entropy of the molecular set divided by attribute A is

$$E(A) = \frac{(S_{1j} + S_{2j} + S_{mj})}{s} \times I(s_1, s_2, \ldots, s_m). \tag{3}$$

Therefore, the information gain based on A is expressed as

$$\text{Gain}(A) = I(s_1, s_2, \ldots, s_m) - E(A). \tag{4}$$

It can be seen that, at this time, $\text{Gain}(A)$ becomes a measure of the degree of certainty. The larger the $\text{Gain}(A)$, the more the information the selected test attribute provides to the classification.

2.3.2. C4.5 Algorithm: Inductive Learning Mechanism Is Adopted. The algorithm considers that the complexity of the decision tree is closely related to the amount of information expressed by the given attribute values [26, 27]. It extends the classification range to digital attributes. This metric tends to partition the data into subsets with low class entropy; that is, most samples belong to a single class. The calculation formula of the entropy of the set S is expressed as

$$\text{Info}(S) = -\sum \left\{ \text{freq}(C_i, |S|) \left[\log_2 \left(\frac{\text{freq}(C_i, S)}{|S|} \right) \right] \right\}. \tag{5}$$

In formula (5), $\text{freq}(C_i, S)$ represents the number of samples belonging to class C_i in set S, and $|S|$ represents the number of samples in set S. Formula (5) only gives the calculation of entropy of a subset. If several subsets are involved after partitioning according to a certain attribute, it is necessary to calculate the weighted sum of entropy of these subsets, as shown in the following formula:

$$\text{Infox}(T) = -\sum \left[\left(\frac{T_i}{|T|} \right) \text{Info}(T_i) \right]. \tag{6}$$

In formula (6), T is a set partitioned according to the attribute X. In order to compare the entropy of different sets more clearly, now calculate the difference between the entropy of the set before the partition and the entropy after the partition, that is, the gain. The node with the larger gain is the node to be selected, as shown in the following formula:

$$\text{Gain}(X) = \text{Info}(T) - \text{Infox}(X). \tag{7}$$

The information gain rate is the information gain divided by the amount of divided information [28, 29]. For the training data set S, it consists of s samples. A is a certain attribute of S. Suppose that the sample is divided by attribute A, and there are n different values. According to these values, S can be divided into n subsets, which are, respectively, $S_1, S_2, \ldots, S_n$. Split information is used to measure the breadth and uniformity of attribute split data, expressed as

$$\text{Split}(S, A) = \sum \frac{S_i}{S} \log_2 \frac{S_i}{S}, \tag{8}$$

The information gain rate is expressed as

$$\text{Gain radio}(A) = \frac{\text{Gain}(A)}{\text{Split}(S, A)}. \tag{9}$$

3. Demand Analysis of Higher Education System

Higher education institutions cultivate high-level applied talents, so that they can quickly adapt to the needs of society and serve the social and economic goals. Its teaching plan is formulated, implemented, and studied in the professional environment in which students are in close contact. Adopt advanced network information technology and modular design concept, the theme of the development of teaching management system, improve college management teaching, and improve the overall quality of talent training [30].

3.1. Overall System Requirements. According to the specific needs and management process, formulate corresponding teaching software, analyze it by using the method of software engineering, and finally design a higher-level teaching management system platform in the field of higher education system by using high-level development language according to the B/S structure of higher education system [31, 32]. The higher education system must first have a basic module of information management, teacher management, and student management, which has the functions of information viewing, deleting, querying, and modifying.

(1) The system can quickly and accurately retrieve the data required by users from massive data and analyze its feedback, so the system must be able to support efficient data retrieval function.

(2) At present, the courses of various colleges and universities are more complex, and there are great differences among various majors, so the software must have strong data mining, analysis, and processing ability.

(3) In the process of software design, the requirements for database are very high, and its algorithm strategy is relatively important. In order to meet the special needs of students in higher education institutions, it is stipulated that most higher education institutions have no more than 10000 students.

(4) In order to accurately analyze the teaching situation, it is necessary to carry out in-depth research and statistical analysis of specific projects to fully reflect the evaluation results, so as to reflect a deeper problem in the teaching process.

3.2. Detailed Functional Requirements

3.2.1. Functional Requirements for Teaching Supervision and Management.

In teaching supervision and management, the main part includes three parts: teachers' evaluation of learning, openness of educational administration, and students' evaluation of teaching. Higher education system is an important management mechanism of a university. It can timely and effectively urge teachers to take effective methods to guide students according to different courses, so that students can absorb and use knowledge more quickly and efficiently. It plays a vital role in the construction of school teachers' team. The purpose of teaching supervision and management is to master students' learning progress, so as to enable students to better complete the established learning plan. There are usually two methods of supervision and management: one is to judge the mastery of the current learning content according to the students' current answer to the questions, so as to determine how to carry out the next learning; the other is to analyze the causes of failure when the current learning fails to meet the requirements, so as to seek improvement suggestions. When judging that students do not master the learning content, arrange the learning content of the same level and give suggestions on new learning methods.

3.2.2. Functional Requirements for Teaching Materials Management.

Teaching materials management includes viewing syllabus, teaching plan, and other rich contents. Teaching material management can effectively assist teachers to teach smoothly, expand teachers' vision, and enrich teaching content while completing teaching tasks [33]. For students, teaching materials not only provide students with necessary scientific and cultural knowledge, but also improve their practical ability and truly realize the all-round development of students' comprehensive ability of morality, intelligence, and physique. Resources from classrooms, laboratories, and multimedia courseware to teaching time arrangement are managed and allocated. It can allocate resources to students according to the teaching process. It can also set up a database to provide the best retrieval tools and management means of teaching materials that can be directly used in classroom teaching.

3.2.3. Functional Requirements for Talent Management.

Talent management includes publishing recruitment information, viewing job information, filling in job information, and viewing recruitment information. Recruitment information release mainly implements the traditional information release method on the automation system. The main functions of recruitment information release include electronic journals, notices, news, and announcements.

(1) News: the news function is a module for publishing important news of the school. Managers with the authority to publish news can publish all kinds of news related to schools or education. People who are allowed to view news can view relevant news at any time, comment on the released news, add pictures, and upload files at the same time.

(2) Announcement: after managers log in to the system, they can use this function to publish certain announcements through certain approval process procedures. Users can view published announcements anytime, anywhere. Managers can choose to send various meeting information and notices to a college, some teachers, some leaders, a department, or all staff.

(3) Notification: the notification function refers to the module that managers send messages to certain departments, teachers, leaders, or all personnel after passing the approval process.

(4) Electronic journals: this function is to upload the specified electronic publications on the office automation system for everyone to read after the managers have passed the approval process of the system. Electronic publications can include the latest scientific and technological paper information, style of colleges and departments, technical documents, etc.

It is a great event of far-reaching significance to strengthen the management of talents in colleges and universities in the new era and build a team of talents with both political integrity and ability. The selection, use, training, and assessment of talents are the basic contents of talent management in colleges and universities. The core of talent management in colleges and universities is to control the human centered dynamic system as a whole, give full play to the advantages of talents in colleges and universities, create the best efficiency of talent groups in colleges and universities, and constantly improve the quality of talent training.

3.2.4. Functional Requirements for Student Management.

Student management is the most important work in educational administration management. The student management module should be able to record in detail the performance of students in school, from enrollment to graduation, and simply and quickly query, count, and analyze various information related to students. It includes the following parts:

(1) Freshmen enrollment: introduction of admission student information, classification of admission students, freshmen registration, generation of student number, etc.

(2) Student management: student registration, student status change, student information query/statistics/export, etc.

(3) Graduation management: expected graduates, graduation audit, degree audit, graduation certificate printing, graduate file generation, graduation departure processing, etc.

(4) Electronic registration: generate various reported data according to the requirements of the competent department, including electronic registration of freshmen/current students/expected graduates/

graduates, student status change information, high base table, preaudit by the school, and audit by the competent department

(5) Enrollment management: formulate enrollment plan and view the implementation of enrollment plan

(6) Reward and punishment management: record student reward, punishment, and punishment cancellation information

(7) Alumni management: alumni inquiry, file management, academic certificate recognition, etc.

With the help of the higher education system, student status management and performance statistical analysis have become extremely efficient and accurate, time-saving, and labor-saving. The functional requirements of student management in higher education system are mainly based on data processing. Its main function is to help teaching administrators collect all kinds of information and sort, classify, process, and store it for query. In addition, it can also provide educational policy consultation and analysis to help relevant school departments do a good job in student management.

3.2.5. Functional Requirements for Teaching Quality Management.
The analysis of teaching quality is an important link. The objective evaluation of teaching quality is needed. Its role is to evaluate the current learning and teaching situation of teachers and students in teaching and to have a standard for the further improvement of teaching work in the future. Among them, a very important indicator is students' test scores. The student achievement subsystem shall have the following functions:

(1) The management personnel of the Academic Affairs Office shall complete the exemption processing, enter the student's make-up examination results in the subexamination room, transfer the student's results according to the student number, identify the changed student's results, accept the grade examination registration, and enter/import the grade examination results

(2) The academic secretary of the department can enter the examination results of all students of the department, or the department can enter the examination results of all courses undertaken by the department

(3) Provide a variety of information query methods

(4) Provide a variety of statistical analysis reports, such as counting the sum of all credit points of a single student in a semester, a school year, or since admission by student number

Actively create conditions, take various measures, pay close attention to the cultivation of teachers' ability to apply modern educational technology, strive to improve the application level of modern educational technology while strengthening the improvement of teachers' professional knowledge and teaching professional ability, and strive to ensure that everyone can operate multimedia and everyone can use modern educational resources, giving full play to the positive role of modern distance education resources and network education resources. Only by vigorously improving classroom teaching efficiency can it be possible to improve the overall teaching level and teaching quality management.

3.3. System Analysis and Related Algorithms

3.3.1. IST Teaching Mode.
Teaching activities in IST are composed of four elements: teachers, students, teaching content, and teaching media. They are interrelated and interact to form an organic whole and show a stable structural form. The so-called teaching model is the stable structural form of the process of teaching activities carried out in a certain environment under the guidance of certain educational ideas, teaching theories, and learning theories [34]. At present, there are three types of popular teaching modes:

(1) The traditional teacher centered teaching model

(2) The "student-centered" teaching model based on constructivism

(3) The "double master" teaching model can not only give play to the leading role of teachers, but also fully reflect the role of students' cognitive subject

3.3.2. Evaluation Algorithm of Students' Cognitive Ability.
The estimation of students' cognitive level is the most important function of analyzing agent and an important method to realize personalized teaching. Without the estimation of cognitive level, it is impossible to analyze students' learning effect and realize systematic personalized teaching control [35].

(1) Representation of student's cognitive level: the cognitive level indicates the degree of a student's mastery of each knowledge. If the cognitive level of students is divided into 6 levels, the degree of membership of each level is expressed as $u_i(i), i = 1, 2, 3, 4, 5, 6$, and K is used to represent the fuzzy set of the cognitive level of students as

$$K = \sum_{i=1}^{6} \frac{u_k(i)}{i}. \tag{10}$$

(2) Expression of students' interest: there are many interests for students. This system gives two ways of presenting interest knowledge and knowledge education. The presentation mode of knowledge refers to the form of media to show the learning content, and the education mode of knowledge refers to the way students like to receive education.

(3) Estimation of cognition level: the estimation of cognition level is the most important part of the student model. Understanding the level of students' cognition of knowledge is an important basis for the next step of teaching. Because the students'

familiarity with a certain knowledge is inherently vague, the membership function s is used to express the familiarity. However, the value of the s function increases monotonically with the increase of x, while the familiarity of students decreases with time. Therefore, this article slightly modified the s function to meet the requirements. The membership function $F(t)$ of student familiarity is defined as

$$s(x,a,B,r) = \begin{cases} 1, & t \leq a, \\ 1 - 2\left(\dfrac{t-a}{r-a}\right)^2, & a \leq t \leq B, \\ 2\left(\dfrac{t-a}{r-a}\right)^2, & B \leq t \leq r, \\ 0, & r \leq t. \end{cases} \tag{11}$$

This paper uses the modification rules as parameters to form the final reasoning method of students' cognitive level, which is defined as the fuzzy set of students' cognitive level.

(4) Calculation of students' cognitive ability: the system determines the courseware used by students when they learn new knowledge points by judging the level of students' cognitive ability. All cognitive ability values of students are expressed in a matrix as follows:

$$\mathbf{A} = \begin{bmatrix} R_{11} & R_{12} & \cdots & R_{1n} \\ R_{21} & R_{22} & \cdots & R_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ R_{m1} & R_{m2} & \cdots & R_{mn} \end{bmatrix}. \tag{12}$$

Then, the calculation formula of students' cognitive ability is

$$z = \frac{\left(\sum_{n=1,m=1}^{n,6} R_{mn} V_n\right)}{n}. \tag{13}$$

4. Higher Education System Design

Considering the development status and theoretical basis of ITS, the system is based on cognitive science theory, adopts the "double master" teaching mode, combines agent technology with ITS, adds a multiagent layer in the middle of the traditional B/S structure system, and forms a three-tier structure model of B/MA/S, namely, Browser/Multiagent Server [36]. Dynamically adjust the teaching strategy according to the specific situation in the teaching process, so as to realize intelligent teaching. The architecture of higher education system is as Figure 3.

The intermediate agent layer is a multiagent structure, which is responsible for communicating the client and server, using the agent's autonomous learning ability and response ability to external things to serve the adaptive

network teaching, and the agents cooperate to complete the students' one-time learning task in the way of task sharing. The background server layer database is mainly composed of student information database and teaching content database. The student information database mainly records students' login number, name, password, students' learning ability level, and other conventional information. Students learn a feature database, including the time of learning a knowledge point, visited links, homework completion time, unit test scores, time spent, questions, and other information. The teaching content should include basic learning materials and test materials.

4.1. System Functional Structure Design. According to the analysis of the functional requirements of the higher education system, the higher education system is divided into six functional modules: teacher management, student management, teaching material management, teaching supervision management, teaching quality management, and talent management. The functional structure of the system is as Figure 4.

(1) Teacher management: the administrator provides the personnel login account, and the system provides the interface for the teacher to fill in the basic information.

(2) Student management: the administrator provides the personnel login account, and the system provides the interface, which is filled in by the students themselves.

(3) Teaching material management: teachers input the syllabus, plan, information, practical teaching, etc. of the courses taught.

(4) Teaching supervision and management: the system provides basic means, such as openness of educational administration, students' evaluation of teaching, separation of examination and teaching, and teachers' evaluation of learning, and uses information sources to analyze school running achievements and problems.

(5) Teaching quality management: collect the opinions of employers, previous graduates' education experts, base leaders, and experts; collect graduates' teaching work investigation, students' employment, enrollment, etc.

(6) Talent management: realize the release of enterprise recruitment information and the filling function of students' resume.

4.2. System Multiagent Structure and Operation Mechanism. The multiagent structure of the system is composed of management, students, teachers, and learning style agents.

(1) Function and design of management agent: the management agent manages other agents, regularly collects the status information of each agent to ensure the normal operation of each agent, is internally
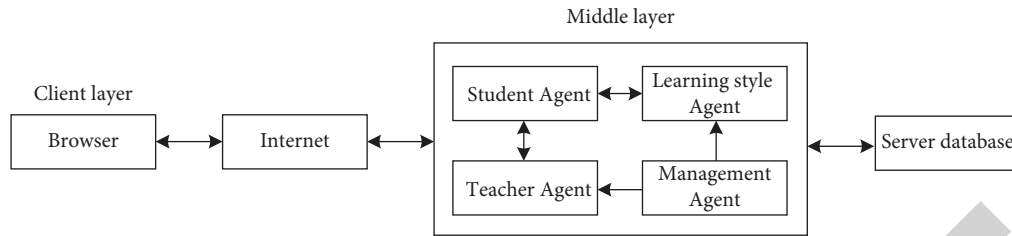
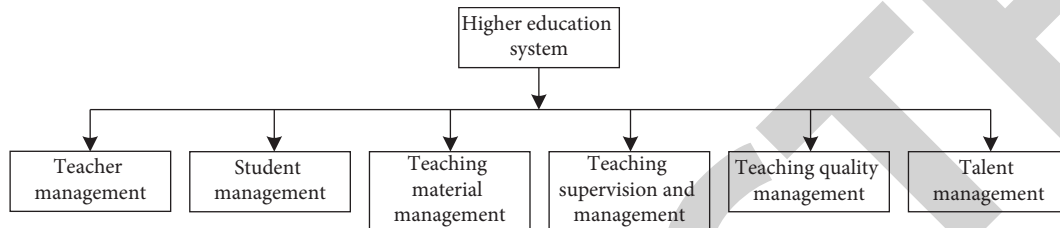FIGURE 3: Higher education system architecture.

FIGURE 4: System function structure diagram.

responsible for the scheduling, planning, coordination, and distribution of tasks in the multiagent structure, and is externally responsible for the communication with other multiagent structures. It is the core of the whole multiagent structure.

(2) Function and design of student agent: the student agent has the largest number in the multiagent framework. The student agent is responsible for handling students' learning activities, tracking students' learning situation, and collecting learning behavior information related to learners. When students are confused in learning, the multiagent structure of the system can provide self-help guidance for learning content.

(3) Construction and design of teacher agent: teacher agent is responsible for dealing with teaching activities related to teachers, actively finding students in need of help, providing ways and means to guide students, supervising teaching contents, and reminding teachers to update learning contents in time. Teachers and users can choose two businesses: teaching content maintenance and individualized learning guidance.

(4) Construction and design of personalized learning: personalized learning agent plays a decisive role in the intelligence and personalization of the whole teaching system. Interact with student agents, analyze, extract, and maintain students' personality characteristics and interests, interact with teachers, and provide personalized basis for their teaching guidance.

4.3. Database Design

4.3.1. Database Model Design. The data center of higher education system is the core of educational administration supervision system. Whether the design of this framework is reasonable or not will directly lead to the performance of the whole system. Therefore, in addition to process changes, the data structure must have stable performance. The system focuses on the requirements of information processing, and the relational model should be considered in the design of the database, which fully meets the design requirements of the database. The steps of database design are as follows:

(1) In the database, collect user information and finally study the requirements of potential users and enterprise managers to collect core information.

(2) The data generated by the model is used to create the required tables, views, databases, and other objects. Database design and normalized business model need to build an entity model and avoid data duplication.

4.3.2. Data Sheet Design. According to a series of functional requirements of higher education system, the reasonable design of data items is as follows:

(1) User information: user login ID, login password, user access rights, etc.

(2) Basic information of students: student number, name, gender, age, native place, date of birth, college number, major number, class number, home address, contact information, etc.

(3) Course information: course ID number, course name, course type ID number, class hour, academic year, etc.

(4) Textbook information: textbook ISBN number, textbook name, author, publisher, edition, inventory, etc.

(5) Teaching evaluation information: teaching staff number, teaching evaluation time, teaching evaluation results, etc.

Teaching plan information: College number, major number, class number, course ID number, opening time, etc.

5. System Test Results and Analysis

5.1. Setting System Test Environment. In order to test the effectiveness of the designed higher education system based on artificial intelligence technology, the system's development tools mainly use ASP technology and Microsoft SQL Server 2000 database system and use multimode ITS teaching mode adaptive selection algorithm. During the development process, ASP technology is used to develop the man-machine interface. Through the man-machine interface, the learner can complete the teaching material learning, and the teacher can complete the teaching guidance process for the learner. Using VC as the development tool, each agent and the main logic algorithm in the system are designed to complete the functional requirements of each part. The test indicators are the proportion of system bugs, system CPU occupancy, and system response time. The methods of [8], the methods of [9], and the proposed methods are compared to verify the performance of the proposed method.

5.2. System Safety Test Results. In order to verify the safety of the proposed method design system, the proportion of system bugs is taken as the system safety evaluation index. Bugs are vulnerabilities that hide some undiscovered defects or problems during the development of this system program. Among them, the lower the proportion of system bugs, the fewer the system vulnerabilities and the higher the system security. By comparing the methods of [8], the methods of [9], and the proposed methods, the proportion of system bugs of different methods is obtained, and the comparison results are as Figure 5.

According to Figure 5, in the system unit, integration, and acceptance test stages, the number of system bugs accounted for 1.75%, 1.5%, and 1.25%, respectively, in the method of [8] and 2.2%, 1.75%, and 2.4%, respectively, in the method of [9], while the number of system bugs accounted for 0.36%, 0.55%, and 0.4%, respectively, in the proposed method. It can be seen that, compared with the method of [8] and the method of [9], the number of system bugs of the proposed method is relatively low, indicating that the system has fewer vulnerabilities and higher system security. The reason is that the system designed in this paper considers the design of intelligent teaching system in the design process and comprehensively uses the technical achievements of artificial intelligence technology, educational psychology, computer science, and other disciplines to form an effective teaching technology for students. To some extent, it can reduce the number of bugs, so as to help students and teachers find hard to find blind spots in learning and teaching and intelligently eliminate blind spots, which can reduce students' learning burden, improve teachers' teaching efficiency, and finally achieve the purpose of improving students' academic performance.

5.3. System Running Speed Test Results. On this basis, the running speed of the system designed by the proposed method is further verified, and the CPU occupancy is taken as the evaluation index of the running speed of the system.
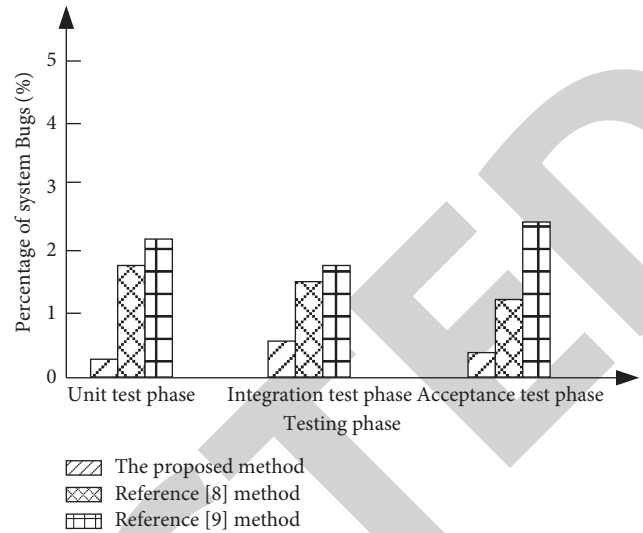

Figure 5: Comparison results of the proportion of system bugs in different methods.
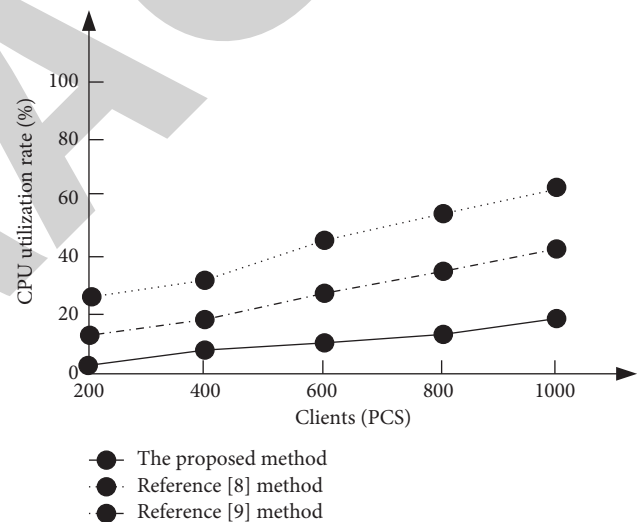

Figure 6: Comparison results of system CPU utilization of different methods.

Among them, the lower the CPU occupancy is, the faster the system runs. The method of [8], the method of [9], and the proposed methods are compared, respectively, and the comparison results of system CPU occupancy of different methods are obtained, as shown in Figure 6.

As can be seen from Figure 6, with the increase of the number of system clients, the system CPU utilization of different methods increases. Among them, when the number of clients reaches 1000, the system CPU occupation rate of the method of [8] is 62%, the system CPU occupation rate of the method of [9] is 41%, and the system CPU occupation rate of the proposed method is only 19%. It can be seen that, compared with the method of [8] and the method of [9], the proposed method has a lower CPU occupancy, indicating that the system runs faster. The reason is that agent technology is used in the design process. It is an active entity of
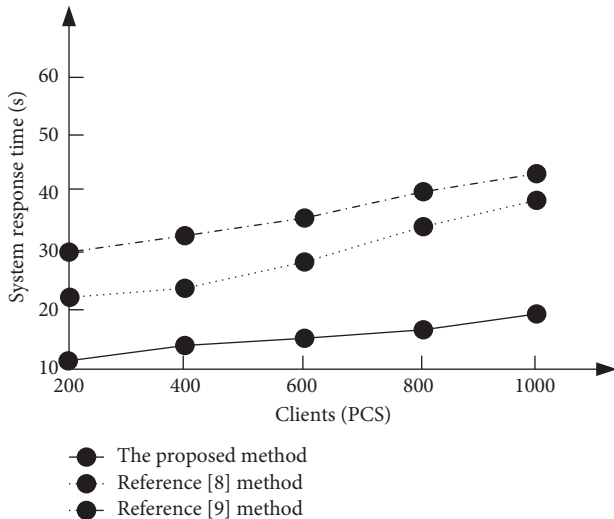
FIGURE 7: Comparison results of system response time of different methods.

intelligent activities with information processing ability, a perceptron for interacting with the outside world, an information processor for processing and storing information, an effector reacting on the environment, and a communication mechanism acting on the inside and outside. It has interactivity, autonomy, purpose, and adaptability. Collaboration and other features, to a certain extent, are conducive to reducing CPU utilization and improving running speed.

5.4. System Response Efficiency Test Results. In order to further verify the system response efficiency of the proposed method, the system response time is taken as the evaluation index of system response efficiency. Among them, the shorter the system response time, the higher the system response efficiency. The methods of [8], the method of [9], and the proposed methods are compared, respectively, and the system response time comparison results of different methods are obtained, as shown in Figure 7.

As can be seen from Figure 7, with the increase of the number of system clients, the system response time of different methods increases. Among them, when the number of clients reaches 1000, the system response time of the method in [8] is 38s, the system response time of the method in [9] is 43s, and the system response time of the proposed method is only 19s. It can be seen that the system response time of the proposed method is shorter than that of the method in [8] and the method in [9], indicating that the system response efficiency is higher. The reason is to use data mining technology to find and analyze massive data and mine some connotation information from these data, so as to reduce the system response time.

6. Conclusion

The higher education system based on artificial intelligence technology designed in this paper gives full play to the advantages of artificial intelligence technology. Its higher

education system has high security and response efficiency and can effectively speed up the operation speed of the system. However, in the higher education system, only the student model, teacher model, teaching strategy, and intelligent teaching inference engine in the system are discussed in detail, but there is no in-depth study on the representation of knowledge and the organization of knowledge base. Therefore, in the next research, we should make in-depth research on the organization of knowledge base, especially the construction and updating of personalized knowledge tree suitable for each student. The system is applied to specific application projects to further verify the effectiveness of the higher education system.

Data Availability

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest

The authors declare that they have no conflicts of interest regarding this work.

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