Computer Aided Instruction Software Design under the Influence of Artificial Intelligence(AI)

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Abstract

In recent years, with the development and popularization of software and hardware technology and network technology, multi-channel and multi-content teaching forms have laid a deep social foundation for computer-aided instruction (CAI) to play an increasingly important role, making CAI gradually become an important means in modern teaching links. Based on this, this paper studies and analyzes the design of CAI software under the influence of AI. Firstly, the characteristics of CAI are analyzed, the application of intelligent agent technology in CAI is discussed, and the framework flow chart is introduced to present the workflow of CAI software; secondly, the intelligent response process of CAI software is introduced through different algorithms. Finally, the feasibility of CAI software under the influence of AI is verified through experiments. It can be used for practical application students' learning. With rich course content and fresh function display, it can fully meet the needs of students' efficient learning.

Keywords: *Artificial Intelligence, Computer Technology, Computer Aided Instruction Software, Teaching Software Design*

1 INTRODUCTION

With the rapid development and powerful function of computer, CAI can provide teachers and students with a personalized learning environment to fully display themselves according to their personal habits. CAI integrates and utilizes various commonly used AI computer technologies, which overcomes the shortcomings of traditional blackboard teaching that only depends on teachers, teaching materials and syllabus. The use of computers in teaching makes people realize the importance of time in teaching and improve teachers' teaching achievements and students' learning efficiency on the basis of effective use of time.

Many scholars at home and abroad have studied the design of CAI software under the influence of AI. Mary Ann a has developed a computer-assisted instruction method to help students learn this course. The researchers used descriptive and developmental research designs to develop and validate Cai, and used Likert type perception tools to determine the perception delivery mode of the least learned topics and courses in animation NCII [6]. Bariham I investigated high school students' cognition of CAI as a teaching and learning tool, and whether gender and school location will affect students' adoption of CAI in learning social research. This study adopts a quantitative research design. CAI helps social research students develop problem-solving skills, collaborative learning, communication, EQ, problem-solving and creativity [3].

Computer assisted instruction takes computer technology, especially database technology as the basic means. Combined with traditional teaching experience, this paper is based on the application of pedagogy, psychology and AI science; starting from the current popular theory of intelligent technology, intelligent technology is produced. The application of intelligent agent technology in CAI is discussed. It involves the commonly used intelligent evaluation test papers, intelligent download test questions and intelligent update system information in CAI system; push the latest achievements of computer development to all fields of teaching practice to the greatest extent. Under the influence of AI, a high-level computer-aided teaching software has been developed [8].

2 DESIGN OF COMPUTER AIDED INSTRUCTION SOFTWARE BASED ON AI

2.1 Characteristics of CAI

Computer aided instruction (hereinafter referred to as CAI) is a method and technology to teach students teaching content and arrange the progress of teaching development with computers as tools and interactive teaching methods. CAI no longer depends on the most primitive teaching forms such as fixed time, place and characters. Due to the effective application of the powerful function of computer, CAI has greatly got rid of human constraints in the storage and performance of knowledge. Therefore, the emergence of CAI is a great change in education and teaching. It liberates the heavy blackboard teaching mode of teachers to a certain extent [1].

CAI emphasizes dynamic teaching, teaching students according to their aptitude according to different levels of students, and realizing the cultivation of talents in combination with people's cognitive law. Dynamically generate teaching questions according to students' cognitive level and combined with the question bank; dynamically adjust the learning content of the next learning stage according to the changes of learners' cognitive level in the learning process; it can automatically solve and answer problems, explain and consult the teaching content, explain and analyze learners' mistakes, correct these mistakes, and evaluate teachers' teaching behavior.

2.2 Application of Intelligent Agent Technology in CAI

The application of AI theory in CAI system is an important link of CAI software, and the quality of using AI technology is an important basis for judging the quality of CAI software. The introduction of intelligent technology into CAI software mainly focuses on the following aspects: intelligent lesson preparation, intelligent guidance for learning, intelligent tracking of students' learning, intelligent statistics of teaching results, intelligent examination, intelligent evaluation of learning results, intelligent update system, etc.

Production system is an intelligent system, which includes three typical parts: data, operation and control; data description status, operation processing data and control decide what kind of operation to choose. A complex system may consist of many subsystems. These subsystems may belong to different levels. The higher the level, the more obvious the boundary of these three parts. The task of artificial intelligence is to effectively organize these three aspects to form a production system. In the production system, data, operation and control correspond to three obvious divisions: the global database is the data structure center of the intelligent

system. It represents the state of the problem space. For different fields, the global database may be some simple numbers or digital arrays, or a very large file structure; production rule set is a set of rules, operations and operators that act on the global database.

Intelligent agent technology can be used in many aspects of CAI software design. The encryption process in CAI can be realized by intelligent agent. In order to start different intelligent agent functions, a mutual communication protocol must be reached between the system and the intelligent agent. Data perception here refers to the capture of the requirements and intentions of the CAI system by the intelligent agent before sending different agents to work. Obviously, if the CAI system shows different characteristics in different operating states and stores the characteristic value, it will be easier for the intelligent agent to perceive its demand intention [9]. The system dynamically stores the eigenvalue in the operating system registry, and the intelligent agent can ignore the demand intention of the system at that time by judging the eigenvalue. Its work flow chart is shown in Figure 1 (a refers to the download test question state, B refers to the test state, and C refers to the system maintenance state).
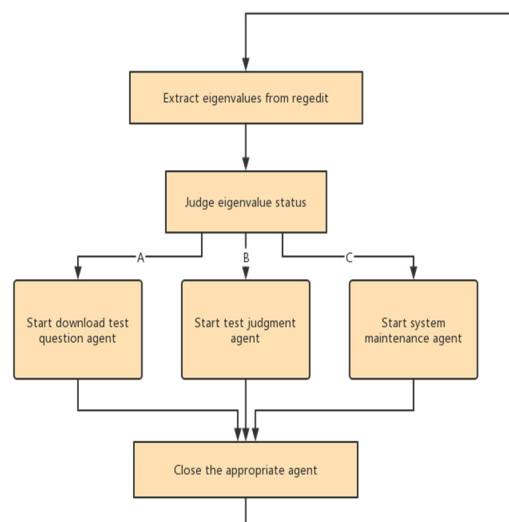

Figure 1. Working state flow chart of agent aware system

Generally speaking, there will be a gap between the system displaying its own working state and the intelligent agent capturing the eigenvalue of the state. The loss of data often occurs in the gap. In order to shorten the gap time and make the communication between intelligent agent and system seamless [2]. It is inevitable to put forward the data perception ability of intelligent agent independently. In this system, it can be seen from Figure 1 that the program execution time ABC of intelligent agent data perception is shortened, the eigenvalue is taken out from regedit, the eigenvalue status is judged, the download test questions are started,

the agent starts the test judgment, and the agent starts the system maintenance. That is, improving the extraction of eigenvalue status and the efficiency of discrimination processing can meet the requirements of the system and avoid the loss of data.

2.2.1 Data processing

If data perception is the basis for the work of intelligent agent, then data processing is the only way for intelligent agent to complete its agent task. Agent is only a form, and the purpose is to complete the agent task. Data processing is not only the way to realize the theory of AI in intelligent agent, but also the core of the application of distributed AI technology. Therefore, its system composition is no more than three obvious divisions: data, operation and control. Of course, due to the different tasks of intelligent agent, the focus of data processing will also be different. Figure 2 describes the workflow of intelligent download test questions in this system [5].
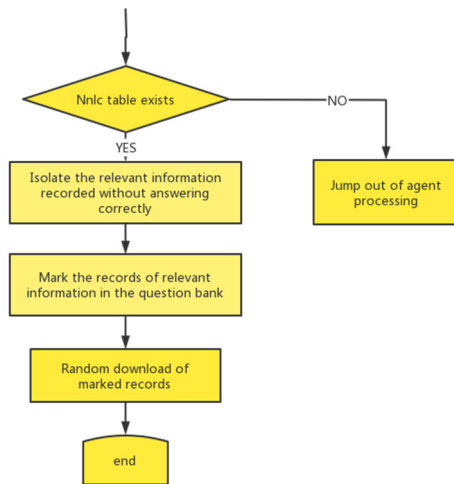

Figure 2. Intelligent download test question flow chart

Its working principle is that when the intelligent agent captures that the CAI system is in the state of about to download test questions, the agent starts to work. First, from info Find the current user's history record in the MDB database. If there is a nonamelanguagechapter table, which records the user's last test questions in the same language and chapter, analyze the user's mastery of the language and chapter, and separate the language points that the user has not mastered; if the form nnlc does not exist, close the agent program, then mark the qualified test questions in the question bank according to the separated information, and finally download the marked test questions randomly [4] [7].

3 INTELLIGENT REPLY PROCESS OF CAI SOFTWARE

3.1 Word Breaking System

It causes the word segmentation system to produce wrong segmentation due to the lack of reference words. In order to solve this problem, the most effective way is to supplement the domain dictionary and strengthen the collection of vocabulary. Therefore, the automatic extraction of new words or keywords has become an early preparation step for word segmentation. Domain key words often appear in documents in this field and rarely in other fields.

Textrank algorithm, in which set V is composed of words in the article. In Chinese, we can use ansj_ SEG for word segmentation screening. Set E consists of words in the article under a specific sliding window. E is a subset of wxw. The weight between any two nodes wi and WJ in the graph is Wij, while for a node wi, in (WI) represents the set of other nodes pointing to the node in the graph. Out (WI) is the set of other nodes pointed to by node wi. The calculation formula is as follows:

$$S(w_i) = (1-d) + d * \sum_{j \in \ln(w_j)} \frac{1}{|Out(w_j)|} s(w_j) \quad (1)$$

Where D is a damping coefficient, and the word breaking result has a significant impact on the research results. The part of English word breaking can be judged as a word as long as there are spaces. After word breaking, there will be many unknown words, and the processing of unknown words has always been a great difficulty in word breaking system. Whether it is person's name, place name, professional terms, proper nouns, abbreviations and other words.

3.2 keyword Weight Calculation

After word segmentation, how to analyze and judge the obtained word segmentation effectively is another important topic. We must find some reasonable keywords from these broken words to do mining and analysis. In this paper, words with low word frequency percentage are considered as keywords. The method is to establish a corpus. The words in the corpus are words that students may often appear. Before defining words, we must first understand the possible problems of students. The most similar K text calculation formulas are:

$$\cos(g_1, g_2) = \sum_{i=1}^{n} \frac{v_{1i}}{\sqrt{\sum_{h=1}^{n} v_{1h}^2}} \times \frac{v_{2i}}{\sqrt{\sum_{h=1}^{n} v_{2h}^2}} \quad (2)$$

The weight of keywords is calculated as formula (3) and (4), which are the frequency and weight of the characteristic items of keywords respectively.

$$v_{ij} = TF * IDF(f_i, d_j) = TF(f_i, d_j) \times IDF(f_i)$$

(3)

$$v_{ij} = \frac{TF(f_i, d_j)}{\max_h TF(f_h, d_j)} \times \left(\log \frac{m}{DF(f_j)} \right) \quad (4)$$

Use textrank4zh system to break the students' discourse articles. Before extracting keywords, we will retain the words with parts of speech as nouns, verbs and adjectives, filter out other parts of speech, and filter it again by using the established adverbial database, which can filter oral idioms or unnecessary adverbials more thoroughly, and the filtered words will make the analysis results more accurate.

4 EXPERIMENTAL TEST AND ANALYSIS

In order to verify the teaching effect of CAI software under the influence of AI, this paper tests the students' interest value, written test score and learning ability value given by the system. Firstly, the students' grade will be evaluated according to the students' preliminarily estimated cognitive ability value and interest value, and then the corresponding learning content will be selected for the students. After each knowledge point (or section or unit) is learned, Provide them with test questions. According to the test results and combined with the students' interest value, evaluate the comprehensive results of students' knowledge points (or sections and units), and adjust the students' learning ability value and students' grade according to the comprehensive results. The test results are shown in Table 1 and Figure 3.

Table 1. Computer aided teaching test results based on AI

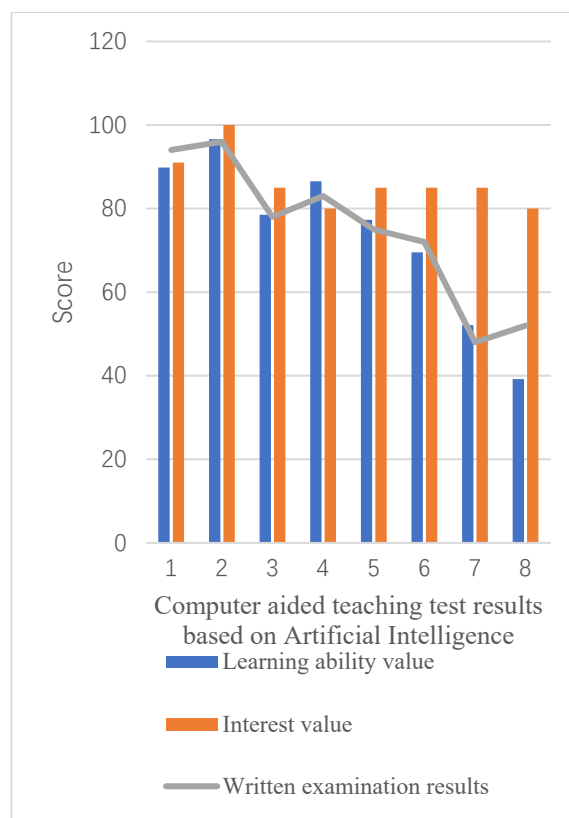| experience group	Learning ability value	Interest value	Written examination results
1	89.8	91	94
2	96.6	100	96
3	78.5	85	78
4	86.5	80	83
5	77.3	85	75
6	69.5	85	72
7	52.1	85	48
8	39.2	80	52

Figure 3. Computer aided teaching test results based on AI

According to the chart data, the learning ability value given by the system is basically consistent with the final test score, indicating that the student model established by the system is basically reasonable. It can be seen that students' overestimation or underestimation of their learning ability has been gradually revised in the learning process, which is basically close to the real situation; and students' interest in learning has increased. It can be seen that the CAI system under the influence of AI has great advantages in improving students' interest and stimulating students' learning enthusiasm.

5 CONCLUSIONS

After years of exploration, the current development of computer-assisted instruction has been rapid. This paper studies and analyzes the design of CAI software under the influence of AI, discusses the intelligent agent technology used in CAI software design, and finally proves that CAI software under the influence of AI can achieve students' learning depth and learning purpose through experimental test. Although the design and implementation of computer teaching software is successful, there are some deficiencies in the process of design and implementation. Due to the limited technology, all the designs are not realized. The content setting of student courses and virtual experiments only shows the characteristic part, and the richness of content needs to be supplemented and updated.

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