

Artificial Intelligence Computer Assisted Instruction System for Basketball Training (ICAI) Characteristics and Performance Analysis

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ABSTRACT: Basketball is a wide range of current popular a kind of sports the school also pay more and more attention to the relevant training for basketball teaching system reform, so the artificial intelligence computer assisted instruction system for basketball training characteristics and performance analysis has become the current physical education in the field of a very important topic. The first basketball game is relatively simple, does not limit the size of the site and the number of players participate in the game. The game is divided into equal number of teams, both were standing on the court, the court judges in the central ball after the team immediately rushed into the ball, and try to throw the ball into the opponent's basket. Because the peach basket has a bottom. After the ball, in the basket, people have boarded the special ladder to get the ball out from the basket. In this study, the first surveyed the current research status of the subject, have probably understanding of industry development; Then the subject involves the relevant theoretical knowledge and technical methods are analyzed; Then constructed artificial intelligence computer assisted instruction system for basketball training; Finally for the experimental system, and process and the experimental results were analyzed. The final result proves that the system is advanced, research is successful.

Keywords: Basketball training, Artificial intelligence, Computer assisted instruction

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1. Introduction

Basketball is that people in their daily life often choose a sport, to improve people's physical quality, enjoy the pleasure of sports alpdye a very important role, at the same time, with the improvement of people security awareness, in order to hurt in sports, the basketball training the importance of also more and more big, a lot of schools have adopted artificial intelligent computer

assisted instruction system for basketball training, therefore, the study of the characteristics of the system and the performance is very important and necessary. The standard of basketball games 28 meters long, 15 meters wide, four line at least 2 meters without any obstacles, such as the indoor ceiling should be at least 7 meters. The pitch line of the front and back, and on the mid line of the circle and rectangle, two semicircle radius penalty free throw back the line is 1 meters below the 80 ring as a restricted zone, often referred to the area. Before the back arches curving outside the region called 3 point shooting, shooting outside the arc arch in 3 points.

For the subject, the current has achieved very good results. Along with the further research of artificial intelligence technology in the 1970 s, the first influential ICAI system in 1970, it is by the Bohr to teach South America geographic knowledge and developed system of SCHOLAR [1]. In the 1980 s, the people of the ICAI system research mainly concentrated in the use of artificial intelligence technology, to stress the guidance of cognitive science, has been clear about the student and teacher module, make the teaching system has better response sensitivity [2]. Although each is not identical, in the form of ICAI system mainly consists of four parts: knowledge base, student model, teacher's module, intelligent interface. It is essentially an expert consulting system, with which not only has the common expert system reasoning to solve function, but also has to understand the learner's learning situation, establish archives for learners to guide learners learning function [3]. Intelligent computer assisted instruction system based on network is a kind of intelligent, open and flexible approach to learning, it has changed the traditional learning mode, is the great revolution to the traditional learning, has not advantage relative to traditional learning [4]. ICAI has certain practical significance in improving the teaching effects, mainly reflected in the following: teaching is conducive to realize scientific, beneficial to bring into full play the enthusiasm of students learning process, specific project assistant teaching system can make the learners from the outline, the plan of curriculum, teaching and training at a glance [5].

The second part of this article studied the subject involves the relevant theoretical knowledge; The third part for building artificial intelligence computer assisted instruction system are discussed in this paper, and analysis; The fourth part, using the method of experiment and through the comparative analysis of the experimental results, proved the advancement and the availability of the system; The fifth part is the full text of the summary and induction, and the future research direction is pointed out the subject.

2. Start of the Art



Figure 1. Common basketball games in the life

The popularity of basketball is very broad, as shown in figure 1 can be seen everywhere in life all kinds of basketball courts for basketball and all ages, as a result, the training of basketball education is particularly important, and artificial intelligence computer assisted instruction system is undoubtedly a very good teaching system. Basketball is 1891 by the American inventor James Naismith. At that time, he teaches international training school in Massachusetts YMCA of Springfield. Due to the local peaches, the children also love to do with the ball into the basket of peaches games very much. It makes him get inspiration from it, and from football, hockey and other characteristics of ball games and compose a basketball game.

2.1 Intelligent Computer Aided Teaching ICAI

The strong ICAI system is comprehensive system engineering, it is the education science, psychological science and cognitive science as the theoretical basis, using artificial intelligence, multimedia technology, data visualization technology, aspects of computer technology, through the study of the characteristics of human thinking and process, learning cognitive model. Artificial intelligence is a branch of computer science, it attempts to understand the essence of the intelligent, and produce a new way to human intelligence similar to react with intelligent machines, this domain research including robot, speech recognition, image recognition, Natural Language Processing artificial intelligence and expert system. From the inception, theory and the technology matures, application fields are expanding, we can imagine, the future of artificial intelligence technology products will bring the wisdom of human being “container”. Artificial intelligence is the consciousness of man, analog information thinking process. Intelligent artificial intelligence is not human, but to think like people, may be more than one intelligence [6]. Artificial intelligence is a challenging science, engaged in the work of the people must understand the computer knowledge, psychology and philosophy. Artificial intelligence is very extensive including science, it consists of Different domains, such as machine learning, computer vision, and so on, generally speaking, a major goal of artificial intelligence research is to make machines capable of complex tasks that usually require human intelligence to complete.

2.2 The Characteristics of ICAI System

Can automatically generate questions and practice; According to the level of learners and learning situation choose and adjust the learning content and progress; In understanding the basis of the teaching content automatically solve the problem, have the answer; Have the generation of natural language and understanding ability, in order to improve the initiative of the human-computer interaction; To the explanation of the teaching content consulting ability; Fault diagnosis of students, analysis the reason and take corrective measures; To evaluate students’ learning behavior; To evaluate teachers’ teaching behavior; To constantly improve teaching strategy in teaching. The teaching strategy is the implementation of the teaching process of teaching ideas, methods, optimization framework integrated whole technology means the three aspects of motivation, pattern formation method and thinking of teaching thinking processing strategy third motivation. Computer aided innovation CAI (Computer Aided Innovation) is a key technology in the development of new products, it is the academic innovation problem in recent years in Europe and the United States rapid development solution (TRIZ) research as the foundation, combining ontology (Ontology), modern design methodology, scientific knowledge of computer software technology and other areas a comprehensive, innovative technology. The related software is called computer aided innovative design software (CAI-Computer Aided Innovation), according to the function, structure and complexity of several different uses of the ten kinds of software, with the development of language in English, also useful in Russian, Chinese and other language software. The teaching strategy is to achieve a teaching goal, the overall program into the teaching process it includes the implementation of the rational organization of teaching process, teaching methods and teaching materials specific procedures, making teachers and students to follow.

2.3 The Theoretical Foundation of the ICAI System and Related Theoretical Basis

Psychological basis: constructionist learning theory, the theory is that learning a process of learners actively constructs the internal information representation [7]. Learners are no longer passively accept outside information, but actively selection process, learners from different background, perspective, according to the external information, based on their background knowledge, with the help of teachers and others, by the unique information processing activity, the process of construct their own meaning [8].

Teaching theory basis: individualized teaching theory, the theory of individualized teaching method, when the same teaching material, teaching methods can’t in class and the differences in the teaching of middle school students, to enable the individual ability, interest, need and possible difficulties, teachers must be in the teaching process special design different teaching plan.

The design theory of “double-principle” teaching mode: double main teaching design is the “leading - main body” teaching system design model (hereinafter referred to as the “double master” mode), the model will give priority to in order to teach and

to learn to give priority to the organic combination of teaching design mode, to avoid the simple use of a teaching design in the process of teaching mode and teaching unilaterally dominated teaching (teachers or students) and the emergence of the phenomenon of “cramming education” or “blind”, enable students to adopt a more reasonable learning strategies to learn at their own content and improve the ability of self-study, optimize the teaching process[9].

3. Methodology

3.1 System Requirements Analysis

System analysis (Systems Analysis) the term was first proposed in 1930s, was based on management problems as the main application object, is a major and crucial stage of the management information system, a key figure for this stage is a system analyst and key problems through this stage of the task is between developers and users to communicate. In 40s, due to its successful application, has been further developed. After several decades, both of the system, or the establishment of a complex system, is widely used in the method of system analysis. Functional requirements: students and teachers model is the two key modules of ICAI system, mainly including several organic parts: student model, teacher model, domain knowledge base library and diagnosis model, also including some vivid and effective interface. So the system’s main function modules include books management, online learning, online examination, interaction between teachers and students, system management, announcement and so on several aspects.

Performance requirements, the design process must ensure that the system is able to long-term, safe, stable, reliable and efficient operation. System processes must be accurate, timely; System must be open and extensible; must be friendly interface; System is easy to operate and maintain.

3.2 Function Modules of the System

At the front desk system mainly include user module, learning module, test module, answering module 4 big modules, including user module contains two aspects of students, teaching tube interface; Learning module mainly students’ online learning content; Test module is to test students for the master degree of chapters; Answering module is realizes the regular teachers for each chapter summarized the answer of the problem; Back end system mainly includes three student module, teacher module, knowledge base module, in which students module contains two aspects of student information, diagnosis module; Teacher’s module is mainly made up of teachers’ information, teaching strategies, and reasoning mechanism; Knowledge base is a collection of knowledge representation, reasoning and data retrieval in the integration of knowledge processing system.

3.3 Database Design Criteria

Database design is in a given application environment, constructing the optimal data model, to set up the database, make it can efficiently store and manage data, construct the application system to support the information processing requirements of various kinds of applications. Database design is one of the important component of the system design, when the design should follow the following principles: the principle of reasonable redundancy; Principle of integrity, consistency and validity; Structured, the standardization and standardized principle; Data confidentiality; Independence and expansible principle; Data structure stability and the principle of relative stability[10].

4. Results Analysis and Discussion

With the development of computer aided education and artificial intelligence, a computer assisted instruction based on the new comprehensive educational technology — intelligent teaching system is booming [11]. Intelligent teaching system is student-centered, computer media, simulation teaching thinking process of experts by using the computer, the formation of man-machine interaction system is open. At present, the development of CAI concourse intelligence embodied in the form of training module, to determine the level of the students and the learning effect, the intelligence in the process of teaching is still lacking. Almost all focuses on the dissemination of knowledge, and through the computer to the students to ask questions, the assessment of students’ learning ability and learning effect according to the students answer. The guiding ideology is still based on the traditional teaching mode, just let the computer and multimedia teaching software to replace teachers only, lead to class The form is single, much to impart knowledge of concourse, other types of teaching software such as access teaching software, the simulation also seldom develop inquiry teaching software [12]. To break this situation, requires the designer to design this link in teaching breaks the traditional thinking of bondage, from the original computer to student questioning change, for students to ask questions and requests to the computer, and then through the interaction between students and computers, to solve the problem, gradually realize the development of the direction of the ICAI (Intelligent Computer Aided Instruction, referred to as

ICAI). The development of basketball sports college intelligent teaching system, the purpose is to promote the application of new teaching in Basketball Teaching in practice, in order to improve the teaching quality of basketball sports colleges and universities to explore a new way. In order to verify that the system is feasible and advanced, we tested the function of the system, the results such as table 1 and table 2.

The input data	The desired performance (average)	The actual average performance
The packaged file 5M	30	25
The packaged file 10M	45	40
The packaged file 100M	400	360

Table 1. Compression and decompression processing time test case table

The input data	The desired performance (average)	The actual average performance
The packaged file 5M	15	12
The packaged file 10M	25	25
The packaged file 100M	100	120

Table 2. Test packets upload and download time table test cases

From the test case, the function realization and realize the basic teaching task handling business requirements and technical requirements, the system is basically stable. At present, the public professional understanding of artificial intelligence, has the problem of information asymmetry, so when put the artificial intelligence in the game, even the world champion candidly admit defeat, it is easy to let a person produce false imagination, as if machine intelligence beyond human[13]. Moreover, compared with the artificial intelligence basketball championship, we expect to see more emotion, thinking of the mature of artificial intelligence. There is a big mistake, isn't it a human level of intelligence, want to see in more social and life scenarios, can deal with all levels of smart, even have the same as human thinking, mood, ability to learn. Students easy to use, teachers' teaching efficiency is improved, the overall effect is good.

5. Conclusions

For basketball sports training teaching method, based on artificial intelligence computer aided teaching system is undoubtedly the most advanced and most widely used method, so the study of the system, further understanding the characteristics and performance will certainly has very important significance. In this study, we first understand the developmental status of ICAI and its application in the field of sports teaching; Then to ICAI needs the theoretical basis of design and technical requirements are discussed in this paper, and analysis; Specific system is established based on the requirements of system function module, and analyses It's; Finally for the design of the function of the system were tested, through the comparison and analysis of experimental results proved that the system is feasible and advanced. Research results show that the artificial intelligent computer assisted instruction system in the basketball training has the incomparable advantages of traditional methods in the teaching, give full play to the advantages of information technology teaching, manifests take the student as the main body, teacher as the leading factor of double main teaching ideas, so as to achieve liberation of human resources, reduce the cost, save energy and promote the development of education modernization.

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