Research on the Application of AI Technology in Computer-Assisted Instruction

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Abstract. The application of AI tech in the field of auxiliary teaching still has many shortcomings and needs to be improved. We need to combine the relevance between AI and auxiliary system to carry out organic application. Based on this, this paper first studies the utilization status of AI tech in Computer-Assisted Instruction (CAI), then analyses the specific utilization of AI tech in CAI, and finally gives the utilization process of AI tech in CAI.

Keywords: AI Tech, Computer-Assisted Instruction, Teaching

1. Introduction

With the iterative progress and maturity of intelligent tech represented by AI, it has been widely studied and popularized in many fields, especially in the field of auxiliary teaching, which greatly promotes the improvement of teaching process [1]. The organic integration of AI tech and teaching can create a more intelligent and humanized teaching environment for the teaching process, and provide a good atmosphere for the development of related teaching activities. On the other hand, the traditional teaching process mostly stays at the level of theory teaching, which is not only boring, but also not easy for students to absorb and understand [2]. With the help of AI tech, students' personalized characteristics can be accurately analyzed, and the actual needs and feedback of students can be efficiently collected and processed, so as to make teaching activities and teaching process more targeted and ensure the development of individualized teaching.

As one of the frontiers and key areas of current research, AI has achieved remarkable utilization and achievements in the field of auxiliary teaching. On the one hand, with the help of AI, the process of problem solving and knowledge representation can be realized; on the other hand, AI tech can make continuous iterative optimization with the help of applied problems, so as to further improve its applicability and practicability in auxiliary teaching [3]. At present, the utilization of AI tech in the field of auxiliary teaching still has many shortcomings and needs to be improved. We need to combine the relevance between AI and auxiliary system to carry out organic utilization, so as to maximize its utilization advantages.

In addition, AI can achieve human like knowledge and behavior by imitating and executing human brain activities, and has several aspects of thinking process as shown in Figure 1 below. AI tech organically integrates the contents of natural language, robotics, knowledge system and other
disciplines and fields, so it has the ability to simulate human's thinking structure, process solving, problem solving and information demonstration and processing.

![Diagram of elements of computer 3D animation tech reconstruction](image)

**Figure 1.** Elements of computer 3D animation tech reconstruction.

In short, AI tech has the ability of perception, memory and thinking, which makes it have a unique utilization value in auxiliary teaching. In the teaching process, with the help of AI tech, it could establish a perceptual data model for the data and values generated by the relevant teaching links [4]. With the help of the model, it could assist the optimization of teachers' refresher teaching activities. In addition, with the data analysis and processing ability of AI tech, students can have a more direct and clear understanding of the teaching content, so that they can better enter the learning state and continuously improve their learning progress. Therefore, it is of great practical value to study the organic utilization of AI tech in auxiliary teaching.

2. **Utilization status of AI tech in CAI**

2.1. *The concept of AI tech and its information processing flow*

AI tech realizes the analysis, judgment and effective processing of objective things by simulating the analysis activities of human brain [5]. In order to effectively reflect the surrounding environment, AI tech needs to have the ability of sense, thinking and behavior. After the AI system is stimulated by external information, a series of thinking activities similar to human brain behavior, such as memory, association, analysis and judgment, are used to realize the decision feedback of information stimulation. The flow of information feedback and processing is shown in Figure 2.

![Diagram of AI information feedback and processing process](image)

**Figure 2.** AI information feedback and processing process.

2.2. *Utilization types of AI tech in CAI*

The utilization types of AI tech in CAI mainly include learning with AI tech and learning from AI tech. The former takes AI tech and tools as a learning tool to process teaching information with the help of AI tech; the latter takes AI as an auxiliary teaching tool to assist a series of teaching processes and activities such as teaching, testing, lesson preparation and management. In addition, the utilization of AI tech in CAI involves natural language processing, theorem proving, robotics and many other aspects, so teachers and students need to have high information literacy.
2.3. Utilization status of AI tech in CAI

At present, the basic language features of AI, the basic strategies of intelligent understanding and problem solving, realize the effective experience and understanding of AI tech, and gradually obtain the understanding of unstructured and semi-structured problem solving process, so that students can more effectively understand the diversity of teaching methods [6]. Secondly, with the help of AI tech to cultivate a variety of ways of thinking of students, to help them better solves many practical problems. In addition, in the field of CAI, the utilization demonstration of AI tech or the use of simple production expert system software, or the utilization of expert system forward and backward reasoning, to achieve the search of teaching resources and heuristic education.

2.4. Problems in the utilization of AI tech in CAI

The utilization of AI tech in teaching is still in its infancy, and it is mainly guided by teachers of information tech courses or comprehensive practice courses. Only a few schools integrate AI tech into classroom teaching organically. And there are still many problems in the utilization of AI tech in CAI, such as the teaching goal of AI tech is not scientific enough, the lack of scientific planning and teaching design, the lack of norms, and the education administrative department cannot give enough attention, the lack of research from the perspective of education.

3. Typical utilization of AI tech in CAI

3.1. Utilization characteristics of AI tech in CAI

The utilization of AI tech in CAI has teaching applicability, meets the relevant needs of teaching, and has a good performance price ratio [7]. This is because the teaching user group decides that its price cannot be too high. Secondly, the utilization of AI tech has certain openness and scalability, and can increase or decrease modules according to the needs, so as to facilitate independent innovation and have friendly human-computer interaction interface. The theory and practice of using AI tech to optimize the education effect and the labor mode of teachers and students mainly includes subject teaching, auxiliary teaching, management teaching, affairs and hosting teaching.

3.2. The function of AI tech in CAI

CAI of AI tech refers to the teaching and learning activities with the help of AI tech and tools as the main teaching media and tools, and has the typical characteristics as shown in Figure 3 below. First of all, from the perspective of sociology, AI tech can intelligently assist the work and learning process of teachers, learning partners, assistants and other functions, and undertake the corresponding tasks to play an efficient function. Secondly, at the level of communication, the utilization of AI tech in computer-aided instruction can make the teaching information communication get a qualitative sublimation. In addition, with the help of AI tech, teachers' knowledge can be greatly expanded, and students' learning burden can be significantly reduced.

![Figure 3. Utilization functions of AI tech in CAI.](attachment:image.png)
knowledge and ability competition [8]. The method of developing subject teaching with AI is mainly aimed at the requirements of teaching objectives, the difficulty of teaching materials, the differences of learning basis and teaching conditions of teaching objects. According to the differences of teaching contents, the teaching methods are also different, as shown in Table 1 below.

Table 1. The method of subject teaching based on AI.

| Teaching subject   | Methods                                      |
|--------------------|----------------------------------------------|
| Theoretical knowledge | Teaching method                             |
| Programming        | Experiment method, task driven method        |
| Philosophy         | Discussion method                            |
| Practical utilization | Visiting and demonstrating                  |
| Design and production | Competition guidance, independent exploration |

4. Utilization process of AI tech in CAI

4.1. The process of CAI based on AI

According to the different progress of AI tech in the process of CAI, the process of CAI based on AI can be divided into three typical stages: preparation, implementation and summary. In different stages of teaching process, each participant has different tasks and functions [9]. Among them, in the preparation stage, with the help of AI tech, teachers can complete course preparation and help students preview before class. In the implementation stage, AI tech can promote the visualization of teaching process, enhance the interactivity and experience of teaching content, so as to help students better understand the teaching content. In addition, in the summary stage, AI tech can make a scientific and objective analysis of students' learning situation, help students to find the lack of knowledge points, and help teachers to optimize teaching.

4.2. CAI mode based on AI

Using AI tech to simulate some laws of natural science or social science can produce a variety of phenomena similar to the real world for students to observe, which helps students to discover and understand the essence of these laws and phenomena. Secondly, with the help of AI tech, it can realize the demonstration simulation, operation simulation and process simulation of teaching process, and has gradually been widely used in subject education. In addition, in the aspect of AI individual counseling mode, thanks to the maturity of miniaturization tech of various AI intelligent terminals, students can easily carry and use AI intelligent learning aids, so as to make the learning process more flexible and free[10]. With the help of AI personalized learning, it can track, record and analyze students' learning situation, and implement personalized learning consultation and guidance.

CAI of AI tech can create an interesting and competitive teaching environment, stimulate students' learning motivation, and enable students to acquire learning knowledge, skills, good psychological quality and other aspects of improvement and progress in an environment full of educational significance and clear teaching objectives. With the help of AI tech, it is also helpful to carry out distance teaching, make full use of the functions of communication, interaction, parallel processing and database of computer system, and realize that the teaching process is no longer restricted by time and space factors. In the auxiliary level of teaching management, AI tech can play the role of planning, organization, coordination, command and control in the management of teaching equipment. Through real-time collection and analysis of classroom teaching information, and quickly provide important information for teachers' teaching decisions and students' choice of learning methods [10].

5. Conclusion

In summary, with the data analysis and processing ability of AI tech, students can have a more direct and clear understanding of the teaching content. AI tech can make continuous iterative optimization with the help of utilization problems, so as to further improve its applicability and practicability in
auxiliary teaching. This paper analyzes the utilization characteristics of AI tech through the research on the utilization status of AI tech in CAI. Through the analysis of the utilization of AI tech in CAI, this paper studies its specific role, and analyzes the process, teaching mode and teaching strategy of CAI based on AI.

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