Research on the Application of AI Intelligent Adaptation System in Primary and Secondary School Learning Process

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Abstract. With the continuous breakthrough of science and technology, the field of education has been affected to a certain extent. AI intellectual adaptation education is the biggest breakthrough in the field of education. AI intelligent adaptive learning system presents a complete process of intelligent adaptive learning, forming a five-in-one learning mode of "testing, learning, training, and testing and assisting." Generally speaking, the learning process of primary and secondary schools is divided into three stages: "preparation pre class, learning in class and review after class." Applying AI adaptive learning system to the learning process can significantly improve the accuracy of knowledge acquisition, enhance students’ interest, improve learning efficiency, greatly reduce learning burden, and make learning more effective.

Basic Overview of AI Intellectual Adaptation

The so-called AI intelligence adaptation education is a student-centered intelligent and personalized education system, whose basic direction is to realize learner self-adaptive learning supported by artificial intelligence. The so-called self-adaptive learning refers to the use of technical means to detect the current learning status and level of learners, to conduct real-time adjustment of learning activities and learning process, and to help students achieve personalized information learning methods. In the self-adaptive learning environment supported by information technology, the self-adaptive system mainly provides learners with learning resources, collaborative interaction and problem solving services. Intelligent adaptive learning not only enables learners to analyze relevant data, provide learning support and services, but also has the ability to deeply understand learners' learning behavior. Intelligent adaptive learning system can accurately assess learners' learning behavior and learning results in real time, accurately locate knowledge weaknesses, plan learners' learning paths, and maximize their learning efficiency. In other words, the greatest advantage of intelligent adaptive learning is that it can achieve in-depth simulation of expert teachers, accurately locate learners' knowledge weaknesses and plan a fast knowledge sequence path for them to achieve learning goals. In the whole teaching process, it is better to use artificial intelligence technology to simulate excellent teachers to achieve the goal of surpassing real-life teaching. It is enough to tailor students to create a suitable plan for their own development.

The Relationship between AI Intellectual Adaptation and Self-adaptation

Self-adaptive education is a way to provide individualized learning for students. By tracing how to answer students’ questions, recommending appropriate learning paths based on their specific behaviors and answers, it can better adapt to students' individual learning needs, so as to teach students in accordance with their aptitude, which can be classified into regular self-adaptive education and irregular self-adaptive education.

Regular self-adaptive education: The relationship between knowledge points is relatively simple. Based on the simple logic of "if-then," the system has a fixed online learning order. According to the pre-set plan, the system transmits the content to the learning users and provides limited learning path planning for the students. As shown in Fig. 1, it is impossible to collect data in real time to dynamically adjust the path according to the users. Real-time feedback of behavior and adjustment of learning path can’t achieve thousands of personalized learning.
Irregular self-adaptive education: The relationship between knowledge points and the path recommendation logic is complex. As shown in Fig. 2, using the knowledge of artificial intelligence, data mining, cognitive science, pedagogy, psychology and behavioral science, students' learning data are collected continuously and in real time. Based on the students' behavior, the next learning content is evaluated in real time. According to the learners' learning objectives and learning objectives, students' learning content is evaluated in real time. Behavior, preference and learning state can dynamically adjust and optimize learning paths in order to achieve the goal of individualized teaching.

Figure 1. Regular Self-adaptive Learning Model. Figure 2. Irregular Self-adaptive Learning Model.

AI education is the vertical application of AI in education industry, which can be divided into recognition class and policy class. Self-adaptive education is a kind of individualized education, which is divided into regular self-adaptive education and irregular self-adaptive education. The irregular self-adaptive education based on AI technology is artificial intelligence self-adaptive education, referred to as AI intelligent adaptation education, as shown in Fig. 3.

Figure 3. The Relationship between AI Intellectual Adaptation Education and Self-adaptive Education.

The Development Situation at Home and Abroad of AI Intellect Adapts

Although intellectual adaptation may be a little strange to the public as opposed to AI, it is not a new concept for academia. In the West, intellectual adaptation has a history of more than ten years, and a large number of educational companies around the world have begun to influx and layout. The most famous one is the adaptation of Knewton in the United States. He has been working in this field for more than 10 years, and has been widely recognized in the last 3 years. In Europe and
America, 3000 primary and secondary schools and universities have used the adaptive education technology of various institutions.

In China, a number of start-ups have poured into the adaptation of intelligence. More and more companies are beginning to focus on the development of AI adaptive learning system. In addition to the human-machine war education, the learning robot of the college entrance examination robot, the flying APIs of the national science and Technology University of 863, the APIs counseling of the intelligent question bank, the spoken language practice, APP fluent language, and the Langfang broadcasting network have all been adapting to the original field. The company's performance in the capital market is very bright, especially in primary and secondary school learning guidance.

**The Five-Ring Learning Model of AI Intelligence Adaptation**

AI intelligent adaptive learning model includes five links: testing, learning, training, experiencing and assisting. This learning model describes the intelligent operation process and the sequence of learning operation structure of intelligent adaptive learning system, aiming at constructing a personalized learning system pointing to precise knowledge points, as shown in Fig. 4.

![The 'Five-Ring' Learning Model of AI Intelligence Adaptation.](image)

**Application of AI Intelligent Adaptation System in Primary and Secondary School Learning Process**

At present, the learning process of primary and secondary schools is usually divided into three stages: preparation pre class, learning in class and review after class. The pre class stage is mainly for students to preview before learning. Students have a preliminary understanding of what they have learned so as to better complete classroom learning. The in class stage is the core stage of the learning process. This stage is that students receive class learning in school, and the teachers teach the students face to face. Due to the limited class teaching time, students' ability to accept new knowledge is uneven, so after class learning, students can’t grasp all knowledge one hundred
percent. The after-school stage is the consolidation stage of the learning process. The main task of this stage is to enable students to master and digest all the knowledge learned in the classroom. AI intelligent adaptation system can play a very good role in the after-school stage, helping students to effectively grasp the knowledge content, play a multiplier effect with half the effort. The application of AI intelligent adaptation system in primary and secondary school learning is shown in Fig. 5.

Figure 5. Application of AI Intelligent Adaptation System in Primary and Secondary School Learning.

AI intelligence adaptation system helps students to consolidate and review the knowledge they have learned in the after-class stage from five links of "test," "study," "practice," "experience" and "supplement."

"Test" helps students quickly locate the weak points of knowledge in classroom learning; through "learning," online re-learning of knowledge content, as if the teacher taught knowledge content for himself again; difficulty stratification, accurate "train" exercises, so that students are separated from the sea tactics, through the completion of appropriate exercises, targeted consolidation of knowledge points; inspect on time and check learning effect in time. Through the analysis of the test results, adjust the learning plan at any time; online "tutor" guidance, real-time answer questions and dispel doubts learning guidance.
Summary

AI intelligent adaptation system can accurately assess learners' learning behavior and learning results in real time, accurately locate knowledge weaknesses, plan learners' learning paths, maximize their learning efficiency, and apply AI intelligent adaptation system to learning process, which can significantly improve the accuracy of knowledge points mastery, enhance learners' interest and improve learning efficiency. With the rapid improvement, students' learning burden has been greatly reduced. Therefore, the application of AI intelligent adaptation system in the learning process will make students' learning more effective.

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