Innovative Application of Artificial Intelligence (AI) in the Management of Higher Education and Teaching

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Abstract. Internet and large data technology provide us with abundant information resources, which has caused great changes in society and economy. Therefore, their application in education and teaching management in colleges and universities has attracted much attention. Artificial intelligence, with its more intelligent, personalized, accurate and diversified characteristics, brings a new idea for the innovation of teaching management methods in colleges and universities. At present, in China, the application of artificial intelligence in the education and teaching management of colleges and universities has got some foundation and achievements, but compared with other industries, it is still at the primary level. It is the direction that AI can be applied to the management of education and teaching in colleges and universities to actively construct the AI ecosystem of higher education and innovate the application mode from the aspects of student management, faculty construction and teaching management. The application of AI will make the management level of education and teaching step on a new level.

Keywords: Artificial Intelligence (AI), the Management of Higher Education and Teaching, Innovative Application

1. Introduction

Artificial Intelligence (AI) was born in the 1950s. In 1950, Turing formally put forward the concept of thinking machine, which is a kind of machine that can independently or interactively perform various anthropomorphic tasks in various environments. In essence, AI studies how to use machines to imitate and perform some intelligent functions of human brain, and develops relevant theories and technologies. The fundamental point is to simulate or realize human intelligence with computers, which is to simulate the thinking, consciousness and activity process of human beings. Finally, like human beings, it can think, even has the ability of deep learning and surpass human intelligence.

Nowadays, driverless, unmanned supermarket, face recognition, intelligent speaker, face payment and other AI technologies are entering people's life, learning and work. Nick Bostrom, a famous AI expert, defines super AI as "much smarter than the smartest human brain in almost all fields, including scientific innovation, general knowledge and social skills". In October 2016, two reports were released
in the USA, which included *Preparing for the Future of the Artificial Intelligence* and *The National Artificial Intelligence Research and Development Strategic Plan*. At the same time, in China, “Circular of the State Council on Printing and Distributing the Development Plan of the New Generation of Artificial Intelligence” has clearly pointed out that in the field of education, we should use intelligent technology to accelerate the reform of talent training mode and teaching method, and build a new education system including intelligent learning and interactive learning [1]. All of these show that many countries in the world pay more and more attention to artificial intelligence. AI will become the key technology adopted in the management of higher education. AI will be deeply integrated with this management, which will lead to the deep reform of the management of higher education and teaching.

This paper is based on the previous research to explore how to apply artificial intelligence (AI) to the teaching management of higher education innovatively, so as to help improve the level of higher education and teaching in an all-round way.

2. Significance of the application of AI in the management of higher education and teaching

In the large data environment, the application of AI technology will subvert the previous education knowledge system, so that there is no boundary between disciplines, general education and professional education interact, and the content of education is constantly diversified. In addition, by using AI learning platform, personal learning behavior data can be completely recorded, which includes everyone's interest, preference, learning level, etc. The system will work out the content, method and schedule suitable for each person to learn, and truly realize personalized service.

AI is a new type of science, which integrates computer science, mobile Internet, large data, cloud computing, sensors, brain science, education neuroscience, bionics, social science and other frontier comprehensive disciplines. Educational AI refers to the field which highly intersects and merges AI technology with educational technology, information technology, neural network, educational science theory, etc. which promotes the intellectualization of education and management. With the continuous advancement of AI technology and its in-depth application in university management, the intelligent level of teaching quality, teaching management, student management, and faculty construction will continue to improve.

3. The application of AI in the management of higher education and teaching has certain foundation

*Circular of the State Council on Printing and Distributing the Development Plan of the New Generation of Artificial Intelligence* and other government documents clearly emphasized that we should accelerate the reform of talent training mode and construct a new education system including smart learning and interactive learning. The application of AI in university management has definite theoretical basis and policy basis.

With the emergence of intelligent robots, AI is gradually applied in the management of higher education and teaching. Intelligent robot can replace teachers to interact with students, guide and answer questions by themselves, and read papers, grade homework, evaluate knowledge, etc. For example, the "educational Super Brain" AI system launched by the famous high tech-enterprise ‘iFLYTEK’ in 2019 can realize voice recognition, face recognition and character recognition. Through the realization of intelligent resource search, data-based teaching process and interactive classroom form, an intelligent teaching environment (as shown in Fig.1) is constructed to accurately assist in improving the learning effect.
4. Innovative application of AI in the management of higher education and teaching

4.1. Constructing AI ecological environment system of higher education

With the development of AI, the management of education and teaching in colleges and universities has also ushered in new vitality and opportunities. The ecological system of educational AI based on individuation is gradually forming. College education itself is a complete dynamic system, in which educators, learners and learning environment are organically linked through a series of teaching activities (as shown in Fig.2). The dynamic interactive process of the three forms a good open environment. Relying on Internet information sharing and collaborative development, the future open education and AI will be further integrated.

4.2 Innovation of student management

Students constitute the main audience of college education, and the management of students continues from enrollment to graduation. Under the guidance of the government, the university can retrieve the
students' online consumption data, credit payment information, campus card usage data through cooperation with scientific research institutions and Internet enterprises, or ask students to fill in questionnaires to obtain their living habits, consumption preferences, personalized choices, interests and hobbies and other information, in order to realize the intelligent management of students.

Large data algorithm can be used to divide dormitories and match roommates, which helps to enhance communication, stimulate potential and create a good learning and living atmosphere. [3] In terms of safety management, by applying face recognition technology to access control, classroom roll call and other systems, we can timely and accurately obtain the time data of students entering or leaving campus, dormitories, classrooms and other places. Through data analysis, we can extract abnormal behaviors, intervene in time, and ensure the safety of students. In terms of academic management, large data and AI technology can be used to develop in-depth academic early warning system, carry out intelligent mining and analysis of students' failure, insufficient credits, and academic risk to generate early warning reports, and automatically push the reports to students, parents, management departments and other relevant personnel at the first time. Through active communication, strengthen attention, and jointly help students complete their studies in a timely and smooth manner. In terms of employment management, the employer's talent demand data, graduates' employment qualification information and their characteristics preference information could be collected and analysed. The data matching method is used to bridge the line between the graduates and the employer, so that the graduates can use their learning and play their own value better, and the employer can also get the needed talents [4].

4.3 Optimize the teaching staff

Teachers are an important determinant of the quality of talent training in universities. The introduction of AI in the teaching process of higher education will help strengthen the construction of the teaching staff, and is conducive to the overall improvement of the quality of college teaching staff.[5]

First of all, relying on the powerful database resources, cloud algorithm, neural network and other advanced technologies, the emergence of AI teachers can place students in various simulation situations, guide students to learn, analyze students' psychology, understand students' personalized needs. They fill up the deficiency of human teachers in education and teaching, and are a powerful supplement to the teaching staff.

Secondly, colleges and universities can use large data and AI technology to analyze the existing teachers' academic background, research direction, age structure and other information. Then combined with the long-term development plan, colleges can optimize the standards of talent introduction, and improve the rationality and scientificity of the construction of teaching staff.

Thirdly, with the wide use of smart classroom, teachers can get the feedback data of students' mastering knowledge and their evaluation of teaching in the first time, which is helpful for teachers to update knowledge reserve, strengthen teaching reform and improve teaching level.

4.4. Strengthen teaching management

First of all, enhance the accuracy of teaching research. Use large data analysis technology and AI to record every student's learning trajectory in detail, analyze every student's learning status in all directions, help teachers to formulate and improve teaching programs, and accurately teach and improve teaching quality according to students' personalized characteristics and learning level.

Secondly, strengthen the construction of teaching resource platform. Build smart classrooms, record teaching videos, upload them to the teaching resource platform, require students to study after class. Based on the number and time of students watching a certain video, analyze the difficulties and key points in teaching, make targeted micro lessons and push them to students, so as to better improve the learning effect. Meanwhile, provide the "course evaluation" plate, a communication and feedback mechanism between teachers and students can be established, which forms a benign circle[6].

Thirdly, strengthen the integration of disciplines. According to the data of students' major, hobbies, career planning and so on, to realize the accurate push of relevant courses and lectures. The college
can encourage the students who have spare power to carry out interdisciplinary learning, and provide convenient and rich learning channels for them, so as to better promote the integration of interdisciplinary knowledge and cultivate compound talents more in line with social needs[7].

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