

Artificial Intelligence Empowers Higher Education

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Abstract

Artificial intelligence (AI) empowers higher education with broad prospects and great potential. Based on the two-wing practical teaching structure of "artificial intelligence + new engineering", this paper explores the concept, technology, application scenarios, and application status of artificial intelligence, and puts forward the challenges and countermeasures faced by artificial intelligence to empower higher education, so as to provide reference value for improving the cultivation of artificial intelligence talents in colleges and universities.

Keywords: Artificial intelligence, higher education, talent training.

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I. INTRODUCTION

The era of intelligence based on cloud computing, big data, blockchain, Internet of Things, machine learning and neural networks has arrived, and artificial intelligence technology has been integrated into all fields of society. Artificial intelligence empowers higher education marks a new way of thinking and new way of higher education development, which has a profound impact on the cultivation of college professionals. In the face of the new requirements for higher education in the era of artificial intelligence, it is not only an important goal of talent training in colleges and universities, but also a realistic requirement of society for talent quality to comprehensively and deeply integrate the new theories, new technologies and new achievements of "artificial intelligence" with higher education, explore new teaching models, optimize traditional teaching content and methods, promote the construction and development of innovative teaching models, and cultivate innovative talents.

II. CONCEPT

2.1 Artificial Intelligence

Artificial Intelligence (AI) is a technology that presents human intelligence through computer programs, which can achieve autonomous decision-making and action through learning, reasoning, perception, etc.

With the progress and development of artificial intelligence technology, more and more artificial intelligence products are used in work and life, and the development of these technologies provides a broader space for the application of artificial intelligence, covering many fields such as medical care, finance, transportation, education, and manufacturing.

2.2 Artificial Intelligence Technology

Today's AI is mainly divided into Narrow Artificial Intelligence (ANI) and Artificial General Intelligence (AGI). ANI is AI designed to perform specific tasks within a limited domain, such as answering questions based on input, but lacking general intelligence. AGI refers to machines with human-level intelligence that can accomplish any intellectual task that a human can do.

At present, the content involved in AI technology includes the following categories:

(1) Data mining and analysis: mainly discusses the capture, processing and analysis of data.

(2) Machine Learning: Mainly discusses deep learning models and applications.

(3) Computer vision: mainly discusses the libraries and applications related to visual recognition.

(4) Natural language analysis: It mainly discusses the recognition and synthesis of natural language, and also involves the content of sentiment analysis.

(5) Deep learning algorithms: Discuss the algorithms and applications of related deep learning.

The specific meaning of these technologies is as follows:

1. Data mining and analysis

Data mining and analysis refers to the acquisition of knowledge from data through data capture, processing, and analysis. Formally, the development process of data mining is iterative. Developers process data iteratively through the following stages:

(1) Interpretation requirements: The vast majority of data mining projects are aimed at specific fields, so data mining technicians can correctly interpret project requirements through communication and cooperation with experts in specific fields. This collaboration will continue throughout the project lifecycle.

(2) Data collection: Most of the data collection is extracted from other business system databases. Many times technicians are sampling data, in which case it is important to understand how the sampling process of the data affects the sampling distribution to ensure that the data used to train and test the model in the evaluation model phase comes from the same distribution.

(3) Preprocessed data: Preprocessed data can be mainly divided into two parts: data preparation and data reduction. The former includes missing value processing, outlier processing, normalization, flattening, time series weighting, etc., while the latter mainly includes dimension reduction, value reduction, and case reduction.

(4) Evaluation model: To be precise, the evaluation model is to choose between different models and find the optimal model. This step is not the whole story of data mining, and in most cases it consumes the least amount of time and effort in the entire process.

(5) Explanatory model: Data mining models are used to assist decision-making in most cases, and people obviously do not make decisions based on "black box models". It is also a very important task to make a reasonable interpretation of the model for the specific environment.

2. Machine learning

Machine learning is informally defined as a technique that gives a computer the ability to learn without programming it directly at a problem. There are several types of machine learning:

(1) Supervised learning: In the training data, each sample has a correct answer. This method has supervision or reference for the correct answer, so it is called supervised learning. It's like a learning process in which a teacher gives instructions on what is right or wrong, and informs the final answer.

Learner: A decision function that learns the correct answer from the training data for prediction of new data.

Typical tasks: predicting the regression of numerical data, predicting the classification of classification labels, and arranging the prediction order.

Applications: Handwriting Character Recognition, Voice Processing, Image Processing, Spam Classification and Blocking, Web Search, Genetic Diagnosis, Stock Prediction, etc.

(2) Unsupervised learning: In the training data, there is no correct answer for each sample. It's like the process of students learning on their own without a teacher. That's why it's called unsupervised learning.

Learner: Find patterns in the training data by yourself.

Typical tasks: clustering (similarities), anomaly detection (outliers).

Applications: Satellite fault diagnosis, video analysis, social networking site analysis, sound signal analysis, data visualization, supervised learning pre-processing tools, etc.

(3) Semi-supervised learning: In the training data, a small number of samples have correct answers. It is a combination of unsupervised and supervised learning, so it is called semi-supervised learning.

Learner: Pattern recognition is performed using large amounts of data that do not have a correct answer, as well as data that has a correct answer. With the help of samples with correct answers, better learning results can be obtained than only samples with no correct answers, and the accuracy of the learner is improved.

Typical tasks: semi-supervised classification, semi-supervised regression, semi-supervised clustering, and semi-supervised dimensionality reduction.

(4) reinforcement learning: reinforcement learning regards learning as a tentative evaluation process, the agent selects an action for the environment, the state changes after the environment accepts the action, and at the same time generates a reinforcement signal (reward or punishment) to feed back to the agent, and the agent selects the next action according to the reinforcement signal and the current state of the environment, and the principle of selection is to increase the probability of receiving positive reinforcement (reward). The action you choose affects not only the immediate boost value, but also the state of the environment at the moment in time and the final boost value.

3. Deep learning

From a statistical point of view, deep learning is to predict the distribution of data, learn a model from the data, and then use this model to predict new data, which requires that the test data and the training data must be identical. Deep learning mainly uses multi-layer neural networks, such as convolutional neural networks,

which are currently more effective, and have better results on images and audio signals. To define a deep learning model, you need to have the following three aspects:

(1) Activation function: i.e., the activation value for the input neuron. The general ones are logistic, tanh, and ReLU.

(2) Cost function: The general learning process is an optimization problem, so a cost function is needed. The cost function is generally Euclidean distance.

(3) Optimization strategy: The simplest optimization strategy is to use shaving down, that is, to update the weight according to the shave, and then reduce the cost function.

Since multi-layer neural networks are usually very complex, it is necessary to solve the problem of overfitting, and the current effective ones are through data augmentation and dropout techniques.

Different from general machine learning algorithms, deep learning can automatically learn features without manually defining features, so it is a machine learning algorithm.

4. Natural language processing

Generally speaking, the purpose of natural language processing is to enable machines to perform certain language functions expected by humans, and natural language processing is the ultimate development goal of artificial intelligence, which is divided into human language processing and machine language translation. The general process includes: speech recognition and synthesis, speech analysis, lexical analysis, syntactic analysis, semantic analysis, and pragmatic analysis. At present, there is no very mature natural language processing model, but the research in this area is very hot, because it is an important part of realizing AI applications.

5. Computer vision

Computer vision is to give the machine the ability to see, such as installing a camera, and using a program algorithm to process the image obtained by the machine through the camera, pattern recognition, and achieve the purpose of understanding. At present, the relevant applications are: OCR technology, image text recognition, face recognition, fingerprint recognition, etc., many smartphones have built-in these functions, and tend to mature. In the process of computer vision learning, many ready-made libraries will be used, such as openCV, DLIB, Face++ and other open-source library files.

III. APPLICATION OF ARTIFICIAL INTELLIGENCE IN EDUCATION

At present, the application of AI and education is mainly reflected in AI-assisted teaching and building smart campuses, such as:

1. Adaptive learning

Adaptive learning is a new type of personalized learning, which is based on artificial intelligence technology, which can comprehensively and real-time evaluate students' learning situation and interests, and provide students with personalized learning plans and teaching content, so as to improve students' learning efficiency and interest. The core of adaptive learning is personalization, which can adjust the learning plan and teaching content in real time according to the learning situation of students, so as to better meet the learning needs of students. The practical application scenarios of adaptive learning are very wide, and can be used for online education, intelligent tutoring, etc.

2. Smart tutoring

The intelligent tutoring system is an electronic tutoring tool based on artificial intelligence technology, which can help students master knowledge and skills through the implementation of intelligent algorithms according to students' learning conditions and needs, and provide students with accurate and personalized tutoring services. These algorithms are able to adapt to students at a fine-grained level and instantiate complex learning principles. The intelligent tutoring system can also understand the learning situation and needs of students by analyzing student learning data, and then provide students with corresponding tutoring services, such as answering questions, exercises, tests, etc.

3. Intelligent teaching management

Intelligent teaching management is to intelligently optimize the school's teaching management through big data analysis and other technologies, and it is a teaching management method based on artificial intelligence technology to improve the efficiency and quality of teaching management. The core of intelligent teaching management is data analysis, which has the advantage of finding problems in teaching management through data analysis, and providing feedback and suggestions for schools, so as to better meet the teaching needs of schools, which are mainly used in school teaching management and online education.

4. Intelligent Assessment

Intelligent assessment is a way to use intelligent technology to evaluate the learning situation, it is the use of big data analysis and other technologies in the teaching and learning process, intelligent assessment of students' learning, and timely feedback to teachers and students in the form of assessment reports, and put forward reasonable suggestions for students' subsequent learning. The core of intelligent assessment is data analysis, and the biggest advantage of intelligent assessment is that it can find problems in students' learning through data analysis, and provide feedback and suggestions for teachers and students, so as to meet students' learning needs in a more targeted manner.

IV. SOME UNIVERSITIES THAT USE AI

Jill Watson of Georgia Tech, one of the most well-known AI teaching assistants in education, was launched in 2016 and deployed to an online forum for AI computer science courses to answer questions from students with a group of human teaching assistants. Throughout the semester after the deployment, students didn't even realize that Jill Watson was an AI teaching assistant. Over the years, the Jill Watson version has been enhanced to quickly set up and equip classes for different grade levels or subject areas to answer students' specific questions about the curriculum. Jill Watson is also equipped with features to connect online students with classroom students, helping to address social barriers for online students in virtual classrooms and helping students build supportive and dynamic learning communities.

Walden University in the United States has deployed three AI virtual teaching assistants: Charlotte, Linda, and Julian, to encourage students to work with virtual teaching assistants to develop communication and crisis management skills and prepare them for employment. Charlotte is a digital assistant chatbot that navigates course content and helps students stay on top of tasks and assignments during lessons. Students can interact with Charlotte by typing questions, and the model processes, explains, and responds. Thousands of students are said to be using the model around the clock, with a problem resolution rate of more than 90%. Linda is a "digital human" who helps students with complex counseling conversation practices, providing virtual simulations for many students aspiring to pursue careers in social work, counseling, and psychology, allowing them to self-test their empathy skills and help students refine their practical skills. Julian is an AI teaching assistant driven by Google Cloud's AI and machine learning capabilities. Julian can automatically index and link course learning content, provide learning activities such as selecting facts, answering questions, paraphrasing exercises, and knowledge notes, and provide feedback to students. Students can have a conversation with Julian through the chat function to consolidate knowledge and identify learning gaps. AI teaching assistants are able to provide personalized instruction to meet the needs of adult learners.

Duke University uses telepresence robots as an educational tool that allows nursing undergraduates to interact with master's and doctoral students and participate in real-time simulations. Through robotic telepresence, master's and doctoral students are able to provide coaching during undergraduate clinical simulations to help solve problems and improve communication skills. Online students can remotely control the "DUSON robot" by using their own devices and present it virtually using video conferencing software. The robot can move from room to room, and the display can be panned or tilted to view from all directions.

Stanford University in the United States has been developing and testing a prototype of a "smart textbook" called "Inquire". Require is a smart textbook that is deeply integrated with artificial intelligence technology, rich in content and interactive functions, delivered on an iPad app that monitors students' attention while reading by paying attention to their interactions with the app. As students read, Require encourages "active reading" by defining key terms and asking questions, prompting students to think by asking different questions about each person's reading level and future direction of inquiry. Require can also link relevant content from the book, supplementing it with photos, videos, and materials to help students understand what they're learning.

On February 18, Peking University released the AI teaching assistant "Brainiac Buddy" (BB for short). It was developed based on GPT-4 to enable personalized, customized, and interactive teaching assistants. At present, BB has appeared in the classroom of Peking University, students can ask BB questions, preview the course, or establish a personalized knowledge base, and the teacher can hand over the AI teaching assistant course lesson plan to improve teaching efficiency.

On February 27, Nanjing University released the overall plan of the "Artificial Intelligence General Education Core Curriculum System". The course is a three-level course of "1+X+Y", based on 1 compulsory core course of artificial intelligence general knowledge + X artificial intelligence literacy course + Y cutting-edge extension courses of deep integration of various disciplines and artificial intelligence, and carries out education and teaching from the three dimensions of knowledge, ability, values and ethics. The AI course will be offered to all freshmen in September 2024, which is the first of its kind among universities in China. The core curriculum system of artificial intelligence general education, combined with the cognitive characteristics and discipline characteristics of students in different professional directions, implements the teaching form of

"collective teaching + small class theme seminar + internship practice + AI teaching assistant" in the form of course organization, and builds an artificial intelligence classroom with deep integration of artificial intelligence technology and deep interaction between man and machine.

On March 3, the teaching cloud platform of Beijing University of Posts and Telecommunications officially launched "Mashang V2.0", which is an intelligent programming teaching application platform independently developed, operated and supported by the EZCoding team of Beijing University of Posts and Telecommunications. In response to the pain points of students' urgent need for one-on-one tutoring in the process of programming teaching, "Mashang" is based on the Xunfei Xinghuo large model, using the core technology developed by BUPT, to provide students with real-time, personalized and heuristic programming tutoring services. It is able to solve most of the problems of students. For a few unsolvable problems, you can click the "Ask for Help" button, and the teacher or teaching assistant will receive on-site notifications and offline email notifications, and come to provide targeted guidance to students in a timely manner, so as to realize the on-demand service of AI and teacher division of labor and collaboration. Teachers can use class management, course management, student management and other functions, and can customize the tutoring functions and modes of their own classes, and can see the full-process, multi-dimensional and fine-grained learning behavior data of students using the "Mashang", so that they can freely carry out teaching experiments and provide students with more targeted and high-quality education services.

The School of Foreign Chinese of Zhejiang University is the first in China to launch the "Wisdom Learning" foreign language intelligent learning platform, which is based on the standards of the Chinese English Proficiency Rating Scale, adopts cognitive diagnostic assessment technology, and is driven by artificial intelligence large models. The platform focuses on the accurate assessment and grading of students' core English skills such as listening, reading, and writing, ensuring that the score data obtained from each test can be completely recorded by the system and stored in the database of the "Cleverlearning" foreign language intelligent learning platform, so that students can access their ability diagnosis reports in each module at any time. These reports not only provide a detailed description of the student's level of English proficiency, but also provide targeted follow-up learning strategies and recommendations for improvement. The platform will organize a phased online self-test activity every three months, so that students can complete the learning tasks and test links online, and teachers can realize the whole process of teaching management electronically through the online review and inquiry system. In addition, the platform has built a set of visual real-time evaluation and feedback mechanism, and all data are dynamically recorded and available for real-time query, which not only helps teachers to comprehensively track and grasp the development of students' English ability, but also provides strong data support for the teaching reform of foreign language education in colleges and universities.

As early as the fall semester of 2023, Tsinghua University has launched a pilot program for AI-enabled teaching. The pilot work mainly uses the 100 billion parameter multi-modal large model GLM jointly developed by the Department of Computer Science and Technology of Tsinghua University and Zhipu Huazhang Company as a platform and technical base to serve the teaching and learning of different disciplines. Recently, Tsinghua University announced a number of explorations and layouts in the deep integration of AI into education and teaching, and will build 100 pilot courses for AI-empowered teaching, and equip every 2024 freshman with an "AI growth assistant". These AI teaching assistants have advantages over human teaching assistants in terms of content accuracy, clear structure, easy to understand, recognition and helpfulness, which can not only provide 24-hour personalized learning support, intelligent assessment and feedback, but also assist students in thinking deeply and stimulating learning inspiration.

Recently, the Hong Kong University of Science and Technology (HKUST) launched the first batch of 10 classroom "AI instructors" in Asia designed using AI generative tools. In order to further enhance students' learning motivation, the AI teacher team brings together different ethnicities, character settings and styles. These elements, which transcend geographical and cultural boundaries, inject freshness into the classroom. What's more, the technology brings to life the images of deceased scientists, making the classroom more interesting. This semester, AI lecturers will teach part of the course "Creative Social Media", so that students can grasp the homogeneity and characteristics of social media social networks, and understand how to use multimedia technology to conduct related academic research.

V. THE SIGNIFICANCE OF AI-ENABLED EDUCATION

Artificial intelligence empowers higher education to meet the needs of high-quality and high-quality development of higher education, meet the needs of the development of the times, and promote the development of educational equity.

1. Meet the needs of high-quality development of higher education

Artificial intelligence empowers higher education to meet the needs of high-quality development of higher education. First, the use of artificial intelligence technology can improve the effectiveness and efficiency

of higher education. In traditional higher education, there is a waste of human resources and time costs, while artificial intelligence technology can automate and intelligently complete some repetitive and tedious tasks, improving the efficiency of teaching and learning. Artificial intelligence can provide teachers and students with a better teaching and learning experience through personalized learning, intelligent assessment, intelligent teaching management, etc., help teachers better manage classes and improve teaching efficiency. According to the learning trajectory and interests of students, unique learning paths and teaching content can be tailored, so that students can feel the joy of learning in personalized tutoring, so as to significantly improve the accuracy and efficiency of learning. At the same time, with the help of the intelligent evaluation mechanism, it can analyze students' learning progress in real time, provide accurate feedback and suggestions for both teachers and students, and ensure that students move towards higher learning achievements in continuous optimization. It can also intelligently optimize the school's teaching management through intelligent teaching management to improve the efficiency and quality of teaching management. Such technological innovation has undoubtedly injected a strong impetus into the future development of the education field.

Second, teachers can use AI technology to design more personalized and targeted teaching plans to meet the learning needs of different students. Artificial intelligence personalized learning is a cutting-edge education model, which uses artificial intelligence and big data analysis and other technologies to deeply explore students' learning potential. With the help of big data, it can analyze students' learning trajectories, accurately capture the learning characteristics and difficulties of each student, intelligently adjust the learning content and difficulty according to students' learning progress and feedback, ensure that students gradually progress in the most suitable learning pace, and gain insight into students' learning bottlenecks to provide them with accurate and effective solutions. Like an experienced private tutor, AI is able to tailor unique learning plans and content to students' actual needs. The AI system tailors efficient learning strategies and targeted teaching content for students to more effectively meet the diverse learning needs of students. This innovative application not only improves the learning effect, but also provides new ideas for the future reform of the education model.

The core of AI personalized learning lies in its powerful data processing capabilities and intelligent algorithms. Through in-depth mining and analysis of multi-dimensional data such as students' learning behaviors and performance changes, artificial intelligence can discover the learning patterns and root causes of problems hidden behind the data. These insights provide educators with valuable references, enabling them to more accurately guide student learning and achieve their educational goals of individualized instruction.

Finally, the use of AI to empower higher education can also facilitate the connection with the needs of society. Artificial intelligence technology can provide real-time labor market information for higher education, which can have a more accurate insight into social needs, adjust and optimize curriculum and content in a timely manner, cultivate talents that meet social needs, and enable students to better plan their career development paths.

It can be seen that the application of artificial intelligence in teaching, learning, management and other aspects will greatly improve the effect, efficiency and docking ability of higher education with social needs, and provide strong support for cultivating professionals with innovative ability and adaptability to the future working environment.

2. Meet the development needs of the times

Artificial intelligence empowers higher education to meet the needs of the times. First of all, the application of artificial intelligence in teaching mode, teaching method, teaching evaluation and other aspects is expected to carry out in-depth reform of traditional higher education. Artificial intelligence technology can make the teaching process more personalized, the teaching mode based on big data is conducive to achieving accurate teaching, and the evaluation system based on intelligent algorithms is helpful to achieve fair and accurate teaching evaluation. Secondly, there is an increasing demand for high-quality technical talents in today's society. The introduction of artificial intelligence into higher education can transfer the latest technical knowledge to students in a timely manner, cultivate their sense of innovation and hands-on ability, help students adapt to the rapidly developing technological environment, and not only meet the society's demand for high-quality technical talents, but also adapt to the transformation of human resources market demand.

With the wide application of emerging technologies such as artificial intelligence, big data, and cloud computing, the demand for industrial upgrading and transformation has put forward a higher knowledge structure, ability structure, and quality structure of talents

3. Promote equitable development of education

In the context of education informatization 2.0, education should focus on cultivating high-quality innovative talents, actively explore the huge potential of artificial intelligence technology in promoting educational equity, and use artificial intelligence technology to inject new impetus into the all-round development of students.

Currently, AI technology plays an important role in promoting equity in education. Through artificial intelligence technology, schools can break through geographical and conditional restrictions, benefit a wider range of students with high-quality educational resources, and alleviate the problem of unbalanced educational resources, such as providing high-quality tutoring services for students in remote areas through intelligent tutoring systems and online learning platforms, and adaptive learning systems can provide corresponding learning content and difficulty for students of different levels, avoiding a "one-size-fits-all" teaching method. With the continuous development and improvement of AI technology, we are expected to see more innovative applications emerge in the future to contribute to the equity and quality improvement of education.

VI. CHALLENGES AND CONTERMEASURES FOR AI EMPOWERMENT IN HIGHER EDUCATION

At the same time, it is also necessary to recognize that the empowerment of higher education by artificial intelligence needs to be improved and deepened to meet the diverse and personalized needs of education and achieve the sustainable development of higher education.

1. Improve teachers' AI skills

With the continuous development and application of artificial intelligence technology, the field of education is ushering in a digital and intelligent transformation. In the traditional teaching model, teachers mainly play the role of knowledge imparters, but with the transformation of education and teaching methods, this role has been difficult to meet the needs of modern education. Teachers need to be transformed into learning facilitators and organizers, guiding students to actively explore knowledge, identify problems, and solve problems. To adapt to this trend, teachers need to continuously learn and master new AI technologies and applications, such as intelligent teaching platforms, adaptive learning systems, etc., to better support students' learning and development. By continuously learning and mastering new AI technologies and applications, teachers can better meet the needs of students and improve the effectiveness and quality of teaching. At the same time, teachers can also use these technologies and applications to carry out more innovative and practical teaching activities to promote the all-round development of students.

At the same time, it is particularly important for colleges and universities to build an all-round teaching team. Colleges and universities should train teachers to master the basic applications of artificial intelligence, so that teachers can effectively use artificial intelligence tools for teaching, and improve their ability to control artificial intelligence courses. Higher education should actively open online and offline courses related to artificial intelligence technology for teachers, and constantly adjust according to the industry needs in the field of higher education and the development trend of artificial intelligence. Improve the curriculum system, so that teachers have a learning channel when they encounter information technology problems, help teachers improve their understanding and application ability of artificial intelligence technology, better use artificial intelligence technology to collect and analyze students' learning data, and provide teachers with insights on students' learning behavior and performance through data collection, help teachers understand students' personal learning styles and learning needs, adjust teaching content and teaching rhythm according to students' learning ability and learning progress, and then provide personalized learning guidance and comprehensive curriculum optimization. Higher education can also simulate the real working environment through artificial intelligence technology, simulate various possible work scenarios, so that teachers can feel the teaching process more intuitively, refine the teaching skills and teaching level of teachers, let students learn and practice in the simulated environment, and improve their practical ability.

2. Strengthen the training of students in AI technology

Artificial intelligence empowers higher education and puts forward higher requirements for students' technical capabilities. In today's digital education environment, students need to learn and master more technical knowledge and practical skills in order to be able to effectively use AI tools to improve the quality and efficiency of learning. First of all, colleges and universities can establish online learning platforms based on artificial intelligence to improve students' adaptability to new teaching models in the context of artificial intelligence, so that they can better develop and progress in an all-round way. These online learning platforms can not only help students improve their learning ability and academic performance by assessing their answers, identifying the knowledge points and weaknesses they have not yet mastered, and providing solutions accordingly, but also use this platform to build online learning teams to help students collaborate and work as a team by providing shared data and resources, and improve team learning ability and collective awareness. Secondly, colleges and universities can introduce intelligent learning tools through online learning platforms to provide all-weather learning resources, so that students can learn anytime and anywhere, gradually adapt to new learning methods, and then promote their independent learning and development. When using intelligent assisted learning tools, artificial intelligence recommendation technology can be used to recommend

personalized learning resources for students according to their learning situation and improve learning efficiency. Third, colleges and universities should strengthen the teaching of professional courses in the field of artificial intelligence, so that students can get in touch with new artificial intelligence technologies earlier, improve their technical proficiency and adaptability through practical operations, and effectively use artificial intelligence technology to improve their learning efficiency in the subsequent learning process. In addition, colleges and universities can promote project-based learning to improve students' adaptability to AI-enabled education, and use AI technology to organize students to participate in more challenging and practical projects, so that students can go deep into AI practice and cultivate their problem-solving skills, teamwork skills, innovative thinking skills and adaptability to various working environments.

3. Strengthen investment in AI-empowered universities

AI-enabled higher education must be strengthened in a planned way to ensure that AI-enabled higher education can be promoted in an orderly manner. First of all, colleges and universities need to actively cultivate and introduce a team of "dual-teacher" teachers who understand both education and technology, who can skillfully operate artificial intelligence tools in the teaching process to guide students to learn, and can also use AI technology to continuously deepen teaching construction and curriculum updates according to the dynamic needs of different majors, upgrade and optimize teaching content, teaching methods, teaching modes, etc., and create a new curriculum and teaching model for artificial intelligence-empowered higher education. At the same time, universities also need to bring in technical talent to update and maintain AI tools to ensure their proper functioning. Second, colleges and universities need to allocate a large number of high-quality AI equipment and tools to give full play to the advantages of AI empowerment. Colleges and universities should also pay attention to the upgrading and transformation of the network environment to ensure that the enabling effect of AI technology is maximized, and provide advanced and high-quality hardware support for AI-enabled higher education. Finally, universities should attach great importance to the AI-enabled financial system, make economic budgets, and list this system as a key development project of the university, so as to create diversified financing channels and financial systems. Colleges and universities can mobilize social forces to introduce social capital, carry out school-enterprise cooperation, establish a return on investment model, and build a diversified fund-raising mechanism. In addition, universities should work with the education authorities to formulate corresponding rules and regulations, and continue to introduce supportive policies to promote the development of AI-enabled higher education, such as subsidies, incentives, and preferential tax policies. Only in this way can higher education stand tall and revitalize under the new generation of digital education innovation, so as to cultivate more professional and technical talents for the society.

4. Strengthen data reliability

The application of AI technology relies heavily on high-quality and reliable data. However, the current education field is faced with challenges such as uneven school conditions, large differences in the degree of informatization, and different degrees of data collection and standardization. These problems have led to certain deficiencies in the quality and reliability of education data. For example, the data quality is affected by the non-standard and inaccurate data collection and annotation, and the unsmooth data sharing and circulation exacerbates the phenomenon of data silos. These problems are undoubtedly a huge challenge for AI systems that rely on data for training and decision-making.

To solve these problems, we can start from a number of aspects. First of all, strengthen the construction of school informatization, improve the automation level of data collection and processing, and reduce human error and interference. Second, unified data collection and labeling standards need to be developed to ensure data accuracy and consistency. In addition, it is also necessary to establish a mechanism for data sharing and circulation, break down data silos, and promote the full use of data and the maximization of value. Of course, the implementation of these solutions requires the cooperation and efforts of the government, schools, enterprises, and other parties. Only through joint efforts and continuous improvement can we gradually solve the problem of education data quality and reliability, and provide a solid data foundation for the application of AI technology in the field of education.

5. Strengthen privacy protection and information security

Artificial intelligence technology requires a large amount of data support, and these data often involve the personal privacy and security of students, so when applying artificial intelligence technology, it is necessary to attach great importance to related data protection work.

First, technology departments should make every effort to promote technological innovation and develop new security and privacy protection technologies to provide stronger and more efficient security guarantees for AI-enabled higher education. Colleges and universities can establish a comprehensive and in-depth information security system and protection mechanism with strong security technology to ensure that the

education information system is protected from cyber attacks, data leaks and other insecurity factors, and establish a timely response and recovery mechanism to respond to and deal with possible information security problems in a timely manner. At the same time, developers of technical systems are expected to have a high sense of ethical responsibility and follow the corresponding privacy agreements and confidentiality contracts.

Second, it is necessary to strengthen ideological guidance. For staff who have access to and process educational data, it is necessary to conduct strict privacy protection training to ensure that their behavior complies with privacy protection rules, and also to make students, teachers and other users fully aware of the importance of personal information protection, and take necessary protection training to reduce the risk of inadvertent data disclosure by internal members.

Third, relevant laws, regulations and policies should be formulated to regulate the application of AI technology in the field of education. The requirements for data collection, storage, use, and sharing should be clarified to ensure that the security and privacy of educational data are effectively guaranteed. In order to prevent risks such as data leakage and abuse, relevant departments should establish a sound data security management system and strengthen technical prevention and supervision. In addition, it is also important to raise public awareness of data privacy and security, and the awareness of data protection in the whole society should be raised through publicity and education. Ensuring the privacy and security of students' data is a prerequisite for the application of AI technology.

As a key area for the future of the country and the hope of the nation, the education sector should strictly control data security and privacy protection. Only by ensuring that students' personal information is fully protected can AI technology better serve the development of education. The government, schools and all sectors of society should work together to provide solid data security for the development of AI technology in the field of education.

III. CONCLUSION

The application of artificial intelligence technology in the field of education has broad prospects and huge potential. In the future, AI is expected to bring many changes to education, including improving teaching efficiency, promoting personalized learning, and promoting educational equity. However, AI-enabled higher education is a double-edged sword, bringing both unprecedented opportunities and challenges. Only by taking a rational view of these challenges and taking effective measures to deal with them can we ensure the healthy and sustainable development of AI technology in the field of education. In the future, with the continuous advancement of technology and the updating of educational concepts, it is believed that artificial intelligence technology will bring more changes and opportunities to the field of education.

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