

Exploration on the Safety Application of AI Big Model in Vocational Colleges

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Abstract: In order to keep up with the pace of the digital era and promote the development of vocational colleges, a multi-mode big data education management security model has been constructed. Firstly, the development and advantages of artificial intelligence were introduced; Then, the application of artificial intelligence in vocational colleges was elaborated from the aspects of teaching design, personalized classrooms, teaching assistance systems, and virtualized internship environments; Finally, From the perspectives of data leakage, cyber attacks, copyright protection disputes, and other aspects, we need to analyze the security risks of educational AI and develop countermeasures. We should continuously learn and improve our security handling capabilities in order to maximize the positive role of AI in education.

Keywords: artificial intelligence, deep learning, multi-modal large model, network security

1 Introduction

With the birth of ChatGPT, it has pushed the world to the era of artificial intelligence. Major industries have paid close attention to it, and powerful companies at home and abroad have also developed their own similar products. The application of AI to serve work is endless, which saves time and cost and achieve breakthrough results. In February 2023, the Central Committee of the Communist Party of China and the State Council issued the Overall Layout Plan for the Construction of Digital China, which pointed out that it is necessary to vigorously implement the national digital education strategic action and improve the national intelligent education platform. In May 2023, the Ministry of Education issued the Action Plan for Deepening the Teaching Reform of Basic Education Curriculum to build a national smart education platform for primary and secondary schools. As vocational college, it is a place to cultivate technical application-oriented talents and skilled craftsmen. For new knowledge and new technologies, they should quickly penetrate into teaching, so that students can master the latest technology today, and quickly improve and grow themselves. This article will delve into the application of AI in vocational education, explore its application risks in modern education, and propose corresponding measures.

2 See the evolutionary history and innovation points of AI

Artificial intelligence (AI) is a technology that uses machines to imitate human thinking and behavior. Its goal is to enhance or replace human mental and physical work. Deep learning is a way to achieve this goal. It is a subset of machine learning and uses deep neural networks to process complex models.

2.1 The development history of AI

The development of science and technology is not achieved overnight. It always depends on the efforts and experience accumulation of predecessors.

The success of ChatGPT is inseparable from the innovation of deep learning technology at the bottom. The development of deep learning technology has gone through four stages: before 2015, the first stage was supervised learning based on non-neural networks, using feature engineering technology; the second stage was based on neural networks between 2013 and 2018, the supervised learning adopts the architectural engineering technology; the third stage, between 2018 and 2019, is to use the text corpus for small model training and adopt the target engineering Objective Engineering Ng technology; the fourth stage is 2020-present, which is a big model based on massive Internet data, autonomous training, using Prompt Engineering technology.

After Google released the Transformer pre-training model in 2017, the OpenAI team was greatly inspired. In 2018, GPT-1 was launched, which also uses training texts to generate content generated by self-supervised pre-training. Since 2019, OpenAI has successively developed GPT-2, GPT-3 and GPT-4. OpenAI has always adhered to the technical route of Transformer, constantly increasing training data and its diversity, and adhering to the concept of quantitative change to qualitative change.[1] As shown in Figure 1. GPT-4 is currently admired by its peers around the world.

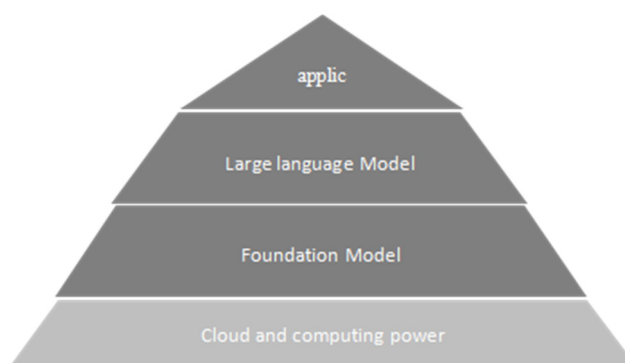


Fig. 1. ChatGPT and its underlying model architecture

2.2 Amazing performance of AI

The difference between ChatGPT and traditional robots is that it has adaptive learning ability and migration learning ability. These of ChatGPT The features are mainly due to its Transformer-based architecture, as well as technologies such as zero sample learning, small

sample learning and instruction fine-tuning. These technologies enable ChatGPT to learn without a large amount of annotation data, thus improving its adaptability and generalization ability. First, ChatGPT has introduced a large number of user-generated content or code data, including Google and news websites, to train, and the ability of model thinking chain has been effectively improved; Second, in large model training, ChatGPT's ability to continuously improve in collaborative and interactive learning with people can constantly learn new knowledge, update parameter models, and adapt to changing application scenarios; Third, through natural instruction learning in model training, data that is more in line with natural language can be constructed, and the generalization ability of large models can be greatly improved.

3 Application scenarios of AI in vocational colleges

From the development, success and characteristics of ChatGPT, it shows that its learning ability has been greatly improved, and its technology is constantly improving. As a vocational college, we should also have this spirit of ChatGPT and make continuous progress in learning.

3.1 AI creates personalized teaching design for teachers

Students in vocational colleges generally have a poor learning foundation. Many students may not have good learning habits, and often have problems such as unclear learning goals, lack of confidence, mental emptiness and a slim future. In addition, they may have a strong desire to express themselves and are willing to focus their excess energy on "interpersonal communication". At the same time, students' values may be swinging, vague and ambiguous. Teachers should map the students according to the class, make a data analysis table for students, and then use AI to assist in making personalized teaching design according to different levels of students. In the process of preparing lessons, teachers can choose the right plan for the students in the class according to the ideas and various schemes provided by AI, preparing lessons for teachers saves time, greatly improves their lesson preparation efficiency and teaching effectiveness, and teachers have also been improved in the application of AI.

3.2 AI builds personalized classrooms for students

Add AI to the "think pair share" thinking routine, augmenting the think-pair-share with ChatGPT could be one of the biggest tech-enabled leaps in pedagogy. [2] We can use the thinking chain to solve complex reasoning problems, and use the "top-down, gradually refine" method to gradually solve reasoning problems. As shown in Figure 2, AI can gradually infer the results by making large models have reasoning thinking through the thinking chain.

AI also has generalization ability, which is the model's ability to predict new data that has not appeared in the training set. In short, the model we trained not only performs well for known data, but also performs well for unknown data. For example, we can train a prediction model that has used a large amount of commodity price data. If a model can accurately predict new commodity prices, then its generalization ability is very good.

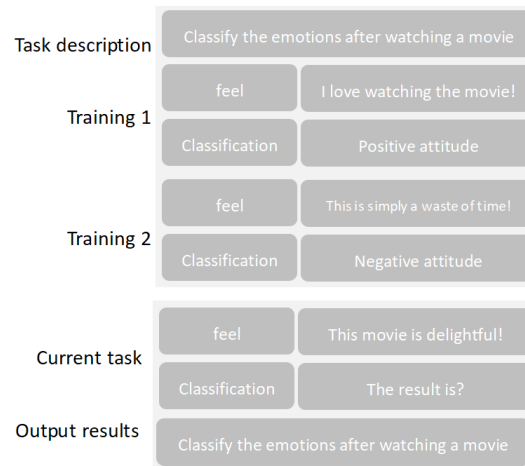


Fig. 2 The inference process of the large model

Some students in vocational colleges feel that the classroom content is boring and uninterested. Some secretly play mobile phones, play games, and even sleep. Teachers should reflect on the phenomenon of students' lack of concentration in class, where students' interests are, how to improve students' interest, and how to make the classroom more attractive to students' attention. At this time, we can borrow AI so that students can learn to use AI and master the skills of dialogue with AI. Teachers guide students to set scenarios in learning and constantly ask new questions to AI, while AI will further reason and constantly feedback the results. At the same time, set questions for AI without any preconditions, and it will find the best answer based on the information learned.

This requires teachers to carefully understand students' personality characteristics, set different scenarios, let students integrate knowledge points into scenario design, and let AI help students learn. While AI gives answers, it also arouses students' interest in learning. In the continuous scenario setting, students also gradually have an in-depth understanding of the next knowledge and achieve the purpose of learning. In this situation, students seem to be engaging in a conversation with artificial intelligence, and they need to focus more on how to ask questions rather than just seeking answers. Only by accurately asking questions can we obtain accurate answers. [3]In the process of learning, teachers should pay attention to guiding them to "lift their strengths and avoid their weaknesses" and be reasonable. At the same time, it is crucial to confirm students' achievements in time, help them build self-confidence and form a progressive atmosphere.

3.3 Generalized intelligent teaching auxiliary system for teachers and students

The use of AI's multi-round dialogue ability can further improve the generalization ability of the model. During the training process, multiple rounds of dialogue data can be used to simulate the interaction process between the user and the model. In this way, the model can learn more complex and flexible dialogue modes, so as to better adapt to new dialogue scenarios that have not appeared in the training set.

AI uses multi-round dialogue ability to collect multi-round dialogue data between teachers and AI as a training set. Using sequence modeling method, AI will capture the contextual content and dependencies in the dialogue, and then define personalized teaching suggestions suitable for teachers' needs according to specific application scenarios. Before class, teachers let students preview the knowledge points in class, and can design related questions or tasks for students to complete. Through the AI-assisted system, students can better understand and master knowledge. For example, the intelligent question answering system can help students to answer difficult questions, and the intelligent recommendation system can recommend suitable learning resources for students. In the aspect of knowledge answering, the ERNIE big model proposed by Baidu can enhance the knowledge of domain entity knowledge and technical terms, and train the model by using the question-answering matching task, so as to deeply understand the domain knowledge and its internal relations. [4] Big data analysis can also reflect the specific situation of higher vocational colleges, teachers and students' management from various angles, and analyze the related data with the help of artificial intelligence systems and historical data, thus helping teachers to clarify students' learning styles, learning needs, learning preferences and other information, providing guarantees for students' individualized learning, and ultimately improving learning efficiency and teaching efficiency. [5]

3.4 Build a virtualized internship environment on campus

Artificial intelligenceMultimodal large model refers to a model that processes multiple types of data (such as text, images, audio, etc.) at the same time. By integrating and interacting with different modes of data, the model can better understand and generate content related to specific scenes. Multi-modal large modelTaxiRole-playing ability means that the model can simulate different roles or identities and answer questions according to the roles played.For this reason, nearly 100,000 corpus have been constructed by calling ChatGPT based on the Selt-Instruct framework, which can continuously generate new instructions according to predefined seed tasks. The whole process uses a semi-automatic (need to initialize seed tasks) iterative boot algorithm. [6] As shown in Figure 3. To leverage the potential of the metaverse as a 3D, global, interconnected, immersive, and real-time online space, we need new ways toconnect the physical world with augmented and virtual reality (VR) experiences. [7]

Affected by the economic environment, the global economy has declined, enterprises have suffered serious layoffs, and it is difficult for graduates to find jobs, making it even more difficult for students to find internships. In order to solve the problem of internship difficulties, some majors can use AI virtualization internship environment to set different internship situations for students. It is also a good choice to complete internships online and offline. According to different majors, schools can use AI to set up different studios for students of different majors and create different tasks and requirements. Students can complete various tasks according to the requirements. At the same time, they can also find corresponding correct solutions in AI to achieve the purpose of internship. This solves the difficulty of not accepting student internships because enterprises are worried about the leakage of information security.

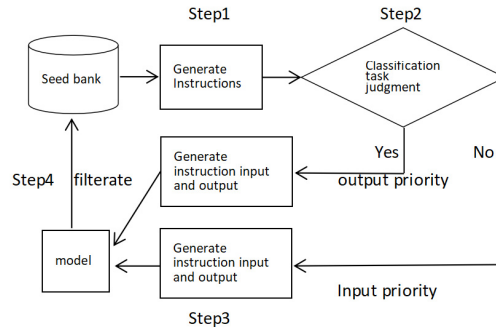


Fig. 3 Self Inspect Framework

3.5 Improve the function of the teaching evaluation system

By using natural language processing (NLP) and machine learning algorithm, AI system can analyze students' homework, test and classroom performance, and provide personalized feedback and suggestions for each student. Based on the ability of sequential task execution, AI system can generate test papers according to test subjects, inspection objectives, topic types, etc. Based on the parsing ability of programming language, AI can conduct efficient code feedback and evaluation, correct code errors and put forward optimization suggestions. [8] Using AI system can help teachers pay more attention to students' learning progress and needs, instead of spending a lot of time on correcting homework and grading. It can evaluate the teaching results, reduce the workload of teachers and improve work efficiency. Similarly, students can also submit their homework to the AI system, and the system will judge the accuracy of the answers and make an evaluation to improve the effect of students' autonomous learning.

3.6 Improve the intelligent facilities for daily school management

As a place where the flow of people is relatively large, the school uses artificial intelligence for campus safety management, such as setting up a face recognition system for school gate security management, face recognition of people entering and leaving, and effectively preventing strangers from entering the campus, which can improve the prevention ability of school gate security. Install intelligent cameras in the classroom to intelligently identify vacant spaces and automatically complete student attendance management, so that teachers can quickly grasp the attendance of students; set up face recognition at the dormitory gate to manage students' dormitory attendance, effectively prevent strangers from entering the dormitory, improve the dormitory management of the school, and ensure the safety of the dormitory.

4 Safety hazards and countermeasures in the application of AI in vocational colleges

When new technologies are first launched and applied, they are immature and need to be fully tested and optimized. AI also has shortcomings and certain risks. Only when we apply AI in education to prevent security risks in a timely manner can AI play an active role.

4.1 Risk of data leakage faced by AI applications and its response

The application of AI systems in education relies heavily on big data, cloud computing, machine learning and other technologies. Its essence is to achieve a high-level simulation of the human brain through intelligent programs composed of loose data and algorithms. In AI systems, both data and algorithms are the core of system implementation. [9] The biggest security risk hidden in the collection, storage and processing of educational big data by AI in vocational education is the leakage of data information, especially the leakage caused by the negligence of management personnel or the disclosure of personal access passwords, which will affect the effectiveness of AI systems in educational applications. Nowadays, facial recognition systems have been applied in the national English four-six level exam. If management personnel neglect to lose data, it will cause the entire exam to be paralyzed. If important information such as students' ID card numbers, mobile phone numbers, current locations, home addresses and parents' mobile phone numbers is leaked, it can be used by illegal elements for fraud, or for loan and bank card applications, or for money laundering. Some are even introduced to pyramid selling circles under the guise of job introductions, and some are cheated into going abroad. It will cause safety concerns for countless individuals and families. According to a survey of 1.6 million users of ChatGPT by Cyberhaven, a data security company, 2.3% of users sent company confidential data to ChatGPT, and employees leaked materials to ChatGPT on average hundreds of times per week. In addition, there was a case in Germany where information was disclosed because the data was stored in plaintext form. After the incident, all information was readable, which is equivalent to expanding the scope of information disclosure. All of these will cause immeasurable losses to individuals and companies.

Because the current ChatGPT and large models use deep learning neural networks to generate text requires massive data to train. When comprehensively assessing the security risks that AI "unlimited development" may bring, the scientific community and government departments proposed to strengthen the supervision and prevention of artificial intelligence. From the perspective of feasibility, it is less difficult to set up a data destruction system at the technical level. For example, you can regularly clean up expired files by simply setting up computers. [10] You can use the "Disk Cleanup" setting in the Windows system to regularly clean up expired files to complete tasks in Windows and self-start environments. For sensitive information such as user data trained by large model data, security measures such as encryption and desensitization should be adopted to strengthen data security to ensure the security of data in the process of storage, transmission and processing.[11] Vocational colleges should keep the data information of students in the AI system, set up password protection for data files, and deal with the expired data of graduates in a timely manner, delete or do encryption, desensitization and other protection, and do important data backup work in a timely manner.

4.2 AI's challenge to cyber attacks on campus

The advent of the digital economy era has accelerated the transformation of traditional industries. As the digital economy enters the advanced stage, the production efficiency has been greatly improved, and it relies more on digging data and the digitization of the whole process. Massive equipment in traditional industries are connected to the network, and the security protection is imperfect, resulting in an increase in network attacks, DDos attacks and network extortion, and the requirements for network security and data security are getting higher and higher. The application of AI system to teaching may cause illegal attacks and information

tampering during storage and transmission of educational big data due to the risk of network attacks. Due to cyber attacks, students and teachers will be unable to log in to the teaching platform and access learning resources, which will affect normal learning and teaching. For example, students' examination results, students' course selection information and examination room information have been tampered with, which will seriously affect the normal management of students and schools. If the school network system is attacked, it may cause important data of teachers and schools to be leaked, such as teachers' scientific research achievements, school's key project research and development, etc., which may be infringed, causing irreparable losses to individuals and schools.

The digitalization of education and the wide application of AI technology will bring new problems and challenges. Model security reinforcement is needed for a variety of technologies adopted by AI. For example, encryption technology is used to encrypt and protect model parameters and inference results; differential privacy and other technologies are used to prevent the model from inferring sensitive information by attackers; multi-factor authentication and other measures are adopted to ensure the identity security of model managers. [12] It is necessary to detect and block attacks on AI in a timely manner, establish an attack response mechanism, and prevent malicious attacks. The abnormal detection technology monitoring system can be used to detect abnormal behaviors in a timely manner and take corresponding countermeasures. At present, major science and technology companies have carried out large-scale safety model application research and development. Checkmarx, the global leader in application security solutions, developed the CheckAI detection plug-in for ChatGPT in order to defend against potential attacks on ChatGPT-generated codes [13]. In April 2023, Google released a cloud security artificial intelligence workbench, which can handle Google's proprietary threat data, assist companies in identifying and stopping malicious activities, and coordinate incident responses. Vocational colleges should first raise the awareness of network security so that all teachers and students can realize the importance of network security; secondly, they should establish a data security governance system. From the technical level, strengthen the research of cutting-edge security technologies, such as strengthening privacy security, data security, algorithm security, application security and system security. The network should be regularly checked and maintained, security vulnerabilities should be detected and repaired in time, and firewalls and anti-virus software should be upgraded regularly to improve network security.

4.3 Copyright protection disputes and resolution caused by AI

When applying AI, ChatGPT uses natural language processing technology to generate text based on a large amount of data analysis. In the field of scientific research, teachers may use AI tools to assist in writing papers, and AI may plagiarize the content of articles from other networks, which will lead to academic misconduct and be accused of infringement without authorization. Some students directly use AI to complete their homework in order to save trouble and do not think about problems. Some students even use AI systems to write graduation papers and are accused of plagiarism. Teachers with serious circumstances will be dismissed and students will not graduate. The academic misconduct of teachers and students can affect the reputation of the school in society and even the future development of the school. The University of Hong Kong sent a letter to teachers and students in February 2023, requesting that students or teachers be prohibited from using ChatGPT and other artificial intelligence tools to

do homework, exams or take notes in class.[14] If you want to use it, you must apply to the teacher in writing in advance, and the teacher must strictly check it.

In short, artificial intelligence obtains training data by using web crawling tools to automatically search on the web page, find suitable materials, and then process and store them to generate text. Whether online training data involves copyright infringement, the European Union and China have initially formulated proposals and norms on the data sharing and circulation system. The 2021 Artificial Intelligence Act was first proposed and an agreement was reached in the European Union on December 8, 2023. The bill aims to negotiate a series of controls on generative AI through the comprehensive supervision of artificial intelligence. China's Cyberspace Administration and other seven departments jointly announced the Interim Measures for the Management of Generated Artificial Intelligence Services, which have made framework provisions on artificial intelligence training. First, the data source is legal; second, respect intellectual property rights; third, data annotation; fourth, the obligation to explain the source, scale and type of training data;Fifth, the legal principle of generating content. [15] If the works used in the training model need to be paid to any author or the author has the right to choose whether to be allowed as training materials, the training data source description undoubtedly provides the author with transparent information so that the author can have the opportunity to exercise his rights. [15] For various AI products developed by science and technology companies, users are free to choose, so where to abide by the legal provisions, or all AI systems in the world follow TCP/IP like network protocols, so they are more optimized in management and monitoring.

4.4 Hidden ethical risks and constraints of AI

School is a place to teach and educate people, and ideological guidance is the key. Using the AI education system can reduce the workload, but it will bring risks due to the imperfect system. First, when AI systems use natural language to process and analyze to generate text, it may lead to text in the system that violates human values, which is contrary to our educational orientation. Second, some AI systems have very high authority in a certain field, but there are problems with system algorithms and data, which leads to wrong judgments in the system, which will mislead students' correct decisions and bring harm to society. Third, the AI system may be biased because learning data leads to incorrect judgments and recommendations, and even has a negative impact on discrimination against certain groups.

Altman, CEO of OpenAI, has publicly said: "ChatGPT is indeed knowledgeable, but in many cases, it will confidently give wrong answers." Because ChatGPT mainly uses unsupervised learning for training, models cannot distinguish between facts and fiction, so that they cannot judge right and wrong, understand the basic reality described by the language, and are not bound by logical reasoning rules. [16] In order to expand the application of ChatGPT and improve the accuracy and security of large models, avoid the replacement of people's main position by machines and algorithms due to technological progress, and avoid "illusions" under the deep intervention of machines, it is necessary to confirm the legal issues of AI in various fields, such as technical ethics and technical boundaries, etc. China has introduced moral restraint regulations for artificial intelligence, such as the NewThe governance principle of a generation of artificial intelligence - the development of responsible artificial intelligence, the new generation of artificial intelligence ethics and other regulations. Vocational colleges can also issue corresponding documents for the application of AI systems, stipulate and restrict the scope

of use of teachers and students, and correctly use AI systems to assist teachers' teaching and students' independent learning.

4.5 Lack of AI education system administrators with AI security knowledge

With the emergence of ChatGPT, the digital era quietly, network security has become a global challenge. From personal information to national security, a secure network system is required. It is crucial for network security professionals with artificial intelligence knowledge to manage the network. We should pay attention to training a large number of network security professionals, who should have multidisciplinary knowledge, such as computer science, data analysis, cryptography, etc. We should pay close attention to industry dynamics, be able to use artificial intelligence technology to learn the latest defense technologies, accurately identify malware and network attacks, and respond quickly when security threats occur to the system. When vocational colleges apply the AI education system, they should set up special artificial intelligence technology service positions, which are required to master and apply the theoretical knowledge and application technology of artificial intelligence, and be responsible for the development, management and maintenance of AI education systems. At the same time, in order to improve the network security awareness of all teachers and students, schools should conduct regular network security education, so that all teachers and students can realize the importance of network security and learn to use network protection knowledge and skills to do a good job in security protection.

5 Conclusion

The birth of new technology has a "double-edged sword" impact on society. In the digital age, we cannot let education lag behind due to fear of potential harm, and must adhere to the guiding principle of "people-oriented", and promote the integration of artificial intelligence into the comprehensive management of vocational education with an "embrace and prevent" mindset. We must uphold the concept of overall national security, adhere to the people-oriented thought, fully leverage human wisdom and subjectivity, seize the opportunities of the AI era, and achieve complementary coexistence with AI.[17] The adoption of AI must reconcile the risks associated with its technical performance, security, data privacy, and ethical considerations. [18] When applying AI in vocational education, teachers and students should learn the spirit of multimodal deep learning, continuously learn and innovate, explore new methods and ideas for education and teaching, and push vocational education towards intelligent development.

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