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Research on the feedback teaching of AI customized development

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Abstract

The current big data and artificial intelligence technologies are leading a new round of social development and promoting industrial transformation and upgrading, but the corresponding professionals are extremely scarce. Through real research projects and the project cases of team members, this project has sorted out a set of AI customized project transformation experience which is suitable for the cultivation of big data professionals in higher vocational education, and actively explores the teaching content, scientific research projects and curriculum system for higher vocational education. Through reform and practice, a personnel training system includes integrating, practical teaching system, student innovation and entrepreneurship teaching system, teaching methods and means, the professional skills and employment competitiveness of vocational students are improved.

Keywords

Artificial Intelligence, Big Data, Customization, Feedback Teaching, Personnel Training.

1. Background Introduction

Artificial intelligence technology is leading a new round of all-round industrial transformation, pushing the human world into the era of intelligence. Machine learning is a core field of research in artificial intelligence [1]. According to the "Global Artificial Intelligence Development White Paper" released by Deloitte in 2019, 89% of AI patent applications and 40% of AI-related patents belong to machine learning. As a hot research direction in the field of machine learning, deep learning provides strong technical support for innovations in the fields of computer vision, autonomous driving, natural language processing, and speech recognition [2]. However, deep learning technology not only leads a new wave of artificial intelligence, but also poses a potential threat to personal privacy data, social stability and national security [3] [4]. Since 2017, voice fraud supported by "deep forgery" technology has attracted widespread attention around the world, and the "face-changing" video incidents of deceptive political figures and public figures have emerged one after another, causing very bad negative effects and even indirectly causing that A military coup of Gabon takes place in the Republic, a country on the west coast of Central Africa [5].

With the continuous emergence of new markets, new businesses and new applications of big data and artificial intelligence, major well-known IT and CT companies at home and abroad have accelerated to occupy the highland of domestic big data and artificial intelligence industries, and southern Zhejiang province has also established branches and R&D centers. , the demand for manpower is growing rapidly [6].

Statistics on the precise demand for big data and artificial intelligence personnels of information technology-related enterprises in various regions are carried out through the Zhaopin recruitment website. The main jobs were intelligent project managers, big data consultants, big data statistics engineers, big data operations managers, big data mining and processing specialists, big data storage engineers, etc [7].

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The increase in the recruitment threshold in the society, coupled with the improvement of college students' self-requirement, makes the number of students applying for the entrance examination for college and university education increase year by year, which objectively reflects the urgent need of college students to improve their learning levels and grades [8]. However, ordinary undergraduate education focuses on theoretical learning, and does not require students to have practical project development experience. The update speed of IT-related professional teaching materials is far less than the speed of technological update iterations, and employers pay more attention to the ability of job seekers to undertake specific work tasks. The stark contrast was formed [9]. Therefore, the back-feeding teaching practice of artificial intelligence-based customized R&D projects in the training of big data professionals in higher vocational colleges is conducive to the cultivation of personnels, and is also a pragmatic move to alleviate the difficulty of recruiting enterprises and students' employment [10] [11].

2. Research Content and Objectives

Combined with the research background and the expected goals of this project, this research will carry out the work as follows:

(1) Improve the "three-dimensional" practical teaching system, and implement skills training-style teaching based on real projects.

Re-plan and build a three-dimensional practice system, improve the big data technology and application training center on campus and more than 5 off-campus practice training bases according to the principles of co-construction, sharing, and co-management, and improve the level of professional conditions and equipment. At the same time, it strengthens practical education, realizes the enterpriseization of on-campus practice teaching, and the classroom-like process of off-campus practice. It introduces the real artificial intelligence project of the enterprise into the classroom, takes the completion of the project task as the leading factor, and fully reflects the occupational situation simulation and ability training based on the work process. The reform of teaching mode has achieved the situationalization of classroom teaching, the projectization of practical teaching, and the systematization of skill training.

(2) Redesign the teaching project according to the working process of the enterprise to realize the connection between the course teaching and the job occupation requirements.

By taking the application and implementation of artificial intelligence projects as classroom teaching projects, open source massive image and video data sets are used to complete the business process and technical implementation process of artificial intelligence projects, so that students can fully understand the application of artificial intelligence systems in the classroom In this way, students can truly combine the knowledge learned in textbooks and theories with practice, so that the content of the exercises is the work they will be engaged in in the future. To enable students to correctly carry out demand analysis, feasibility analysis and overall planning of enterprise informatization construction, not only can operate and apply common information systems, but also form a complete set of artificial intelligence industry information in the implementation and practice of actual enterprises standardized implementation methods, standard implementation processes and industry solutions.

This topic takes the Wenzhou Municipal Science and Technology Bureau's industrial science and technology project "Research on Intelligent Identification of Face Synthetic Video Based on Generative Adversarial Networks" hosted by the project leader as an example to carry out research and development feedback teaching, as shown in Figure 1.

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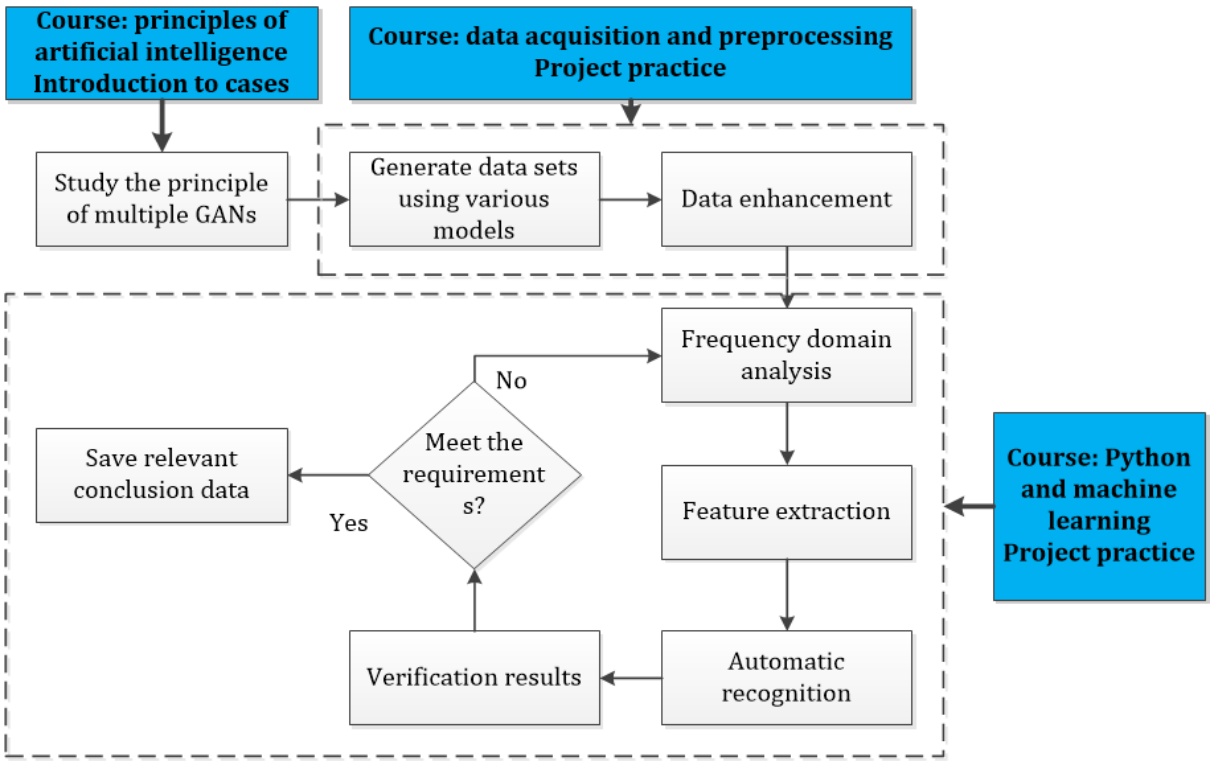

Figure 1: The Process of the research and development project feeding back teaching practice

The technical process is compiled into training materials based on real projects, and experimental reports and related experimental materials are formulated.

(3) Give full play to the role of "dual main body" and comprehensively promote the training of artificial intelligence customized development personnels

Adhere to the road of combining government, production, education, research and application, and unite AI software suppliers and enterprises to give full play to the special role of their "dual identities" as both a demander of information personnels and a joint trainer, fully participate in the personnel training process, and promote This "dual-subject" school-running model and joint training method consolidate the responsibilities and rights of both schools and enterprises in the personnel training process in the form of order training, and ensure that the training quality meets the partner's own employment requirements, as shown in Figure 2.

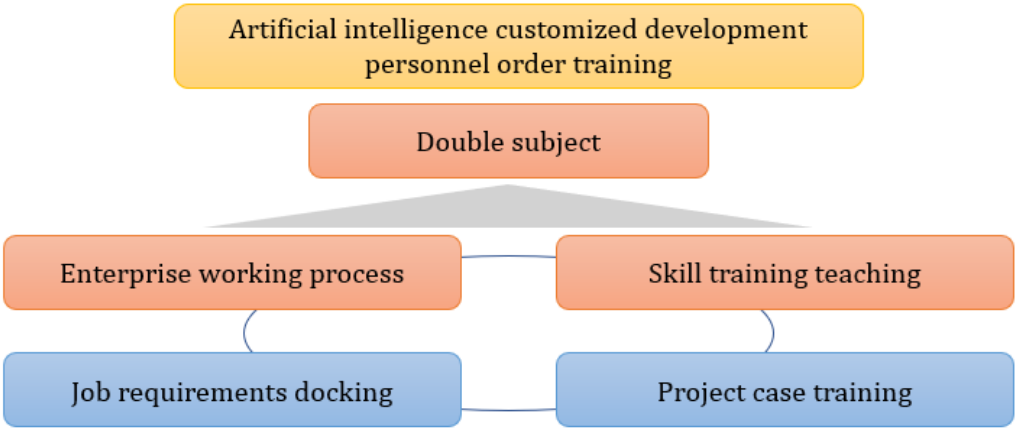

Figure 2: Order training of artificial intelligence customized development personnels

1) Effectively carry out school-enterprise interaction, improve students' professional knowledge and skills, and achieve "zero distance" for employment. Every year, artificial intelligence experts, scholars, and corporate CIOs, as well as technical service personnel or

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implementation consultants from companies such as Wenzhou Kingdee, Wenzhou UFIDA, and Zhejiang Kayi Medical, are invited to the school to conduct technical reports and academic discussions on AI-related system construction, so as to expand students' knowledge structure.

2) Organizing Zhejiang Kayi Smart Medical Order Class, starting from the summer when students end their freshman year. According to the two-way choice between students and enterprises, and conducting targeted training according to the company's employment requirements, students enter the company for social practice in summer, and are arranged in each semester for a certain period of time. The company's technical service personnel and implementation consultants will train students on technical service knowledge and project implementation methods. In the graduation design stage of the junior year, the real project of the enterprise is regarded as the graduation design topic, and the school tutors and enterprise tutors jointly guide the graduation design. The students participate in the implementation process of the enterprise's informatization project. When the students graduate, their employment will be solved by these companies (entering the cooperative company or recommending to work in the client company).

3. Existing Foundation

This project cooperates with a number of R&D institutions in the research process to serve the school-running concept of Wenzhou's local economic and social development, provide technical support for relevant departments and enterprise informatization applications, and also promote the construction of big data technology and application majors in our school. Better carry out school-enterprise cooperation to alleviate the current shortage of computer personnels in society. At present, the following foundations support this project:

(1) "Research on Dynamic PPI Data of Clustering Integration and Incremental Learning Model under Spark". In order to improve the performance of the swarm intelligence algorithm, this project applies the parallel swarm intelligence algorithm and the parallel computing capability of the Spark framework. Cluster ensemble and incremental learning models under Spark are used to obtain the results of the original PPI network. Through the refinement operation, the local optimum of the clustering results is effectively avoided. The results show that compared with other detection algorithms, the algorithm achieves better results and handles large-scale data efficiently. In short, the model has potential application value, and the research results expand the research and application of swarm intelligence algorithms and related technologies to a certain extent, and can effectively solve practical engineering optimization problems.

(2) The Practice of Big Data Course Resource Construction under the Mode of Promotion of Teaching by Competition - Taking the Course of "Basics of Big Data Technology" as an Example". The course "Basics of Big Data Technology" is a combination of theory and practice about big data technology. The basic courses of this course involve Hadoop environment deployment, Python foundation and application in big data environment (including data cleaning, import, analysis and visualization), so that students have certain big data analysis and application ability, and do a good job in the resources of this course construction, which will have a very positive effect on the training and application of big data personnels. With the rapid advancement of the era of big data, it is of great significance to explore the education system, mode and method under the new situation to promote the construction of big data teaching in our school.

It cannot fully meet the current needs of classroom teaching innovation and layered teaching. The construction of high-quality and rich educational resources based on the network environment will be the core of the college's teaching resources, which can satisfy the diversification, socialization and subjectivation of teaching and learning processes. At present, the problem of teaching resources has become the "bottleneck" that restricts the development

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of this course. Only by solving the problem of teaching resources, integrating these resources in the subject teaching courses, and making full use of these teaching resources can the classroom grouping and stratified teaching and resources be realized and shared. The "Big Data Technology Foundation" classroom teaching resource construction project is to meet the "Big Data Technology Foundation" course construction and teaching needs, integrate excellent teaching resources, realize the sharing of resources, improve the teaching effect, and improve the teaching quality.

In recent years, our school has successively won the second prize in Zhejiang Province and the national second prize in the Big Data Vocational College Competition, which greatly inspired students' enthusiasm for learning big data technology to cultivate more big data professionals through teaching and teaching competition".

(3) "Research on Intelligent Identification of Face Synthesized Video Based on Generative Adversarial Networks". The advancement of artificial intelligence technology has made it very easy to modify videos and images, and deepfake technology has been used to retaliate, make pornographic photos of celebrities, and blackmail someone or making fake news. The greatest risk of malicious use of the technology may occur in the political sphere. If it is used by competitors, it is very likely to be used to discredit national leaders, incite terror and violence, and undermine national political stability. It may also become a powerful weapon for information warfare, disrupting normal relations between nations. Deepfakes may also have an incalculable negative impact on corporate image damage. If deepfake technology tampers with the content of corporate executives, spreads false news, or directly discredits the person in charge of the company by synthesizing fake videos, it will undoubtedly damage the company's public reputation. The image in the mind, which in turn affects the company's reputation and economic interests. It could also provide a new source of instability for turmoil in financial markets. For example, some people put on the Internet fake videos of multiple well-known economists chanting badly about the economy at the same time, or a terrorist attack on an important bank, which is likely to cause market panic and make a large number of investors. Sell the stock in your hands, and the perpetrator can profit by shorting it.

Because it is easy to generate false information, it is difficult to distinguish the authenticity of a large amount of data published on the Internet, and it is also very difficult to crack down on forged content. The most fundamental impact of deepfake technology is that it will further blur the boundaries between truth and illusion, making everyone doubt everything, which may cause a crisis of trust in the whole society. Only by deeply understanding the technology and principles of deep-fake, and applying the latest technology in anti-counterfeiting in a timely manner, can we quickly and intelligently identify massive amounts of fake data, inform the public of the truth in a timely manner, and provide sufficient legal basis for disputes.

In addition, the unit currently has dedicated servers and GPUs for big data research and development to study AI technologies such as deep learning. The college library has a collection of more than 1 million books, covering various aspects such as computer and mathematics; it has subscribed to more than 1,500 domestic and foreign newspapers and magazines, including a complete set of materials from the National People's Congress Copy Center, including databases such as CSMAR, CNKI, VIP Papers, etc., can simultaneously view the full text of more than 6,000 journals, and download and collect research results related to this topic. The total amount of data sources involved in this project exceeds 1TB, and team members will select suitable and valuable research data from them for training and verification to achieve the expected results.

Project leader, whose main research fields are big data, deep learning and artificial intelligence, has been engaged in relevant research for nearly 20 years. The members of the project team have the knowledge base and scientific research background of computer, data mining, artificial intelligence, information system management and other disciplines, can fully meet all the needs

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of completing the project, and have the research foundation, knowledge accumulation and personnel necessary conditions to ensure the completion of the project. The team has solid R & D ability and close contact with many Wenzhou high-tech enterprises, which are conducive to the completion of the research work of this subject.

4. Key Solutions

The key solutions to be addressed by this project are as follows:

(1) Students participate in the development process of real AI projects, cultivate AI-skilled personnels, and alleviate the social shortage of AI personnels.

Through a series of teaching and training of artificial intelligence-related projects for students, students have certain AI application development skills, cultivate a large number of AI personnels for the society, and alleviate the current shortage of AI personnels.

(2) Sign industry-education integration strategic cooperation agreements with well-known domestic enterprises, establish a group of student practice bases, and choose large-scale AI companies and AI software application companies for the practice bases.

By signing industry-education integration strategic cooperation agreements with well-known domestic enterprises, dozens of social practice opportunities corresponding to majors are provided to students every year. Students enter the enterprise's AI customized practice project in the graduation design stage, so that students can understand the employment environment in advance, be connected with enterprises in advance, and reach employment intentions with the internship enterprises in advance through summer social practice.

(3) Continue to sum up experience in the process of project implementation, and gradually complete the teaching materials of large-scale software-related courses.

As the current major of big data technology and application is a new technology application major in our school, there are many unknowns in professional construction. By taking big data artificial intelligence as a characteristic teaching, we will gradually complete the teaching materials of AI customized software related courses, so that students have artificial intelligence skills. The specialty of application development will enable students to have strong employment competitiveness, reflecting the competitive advantage of this major.

5. Implementation progress

According to the national goal of Vocational Education in the new era, combined with the characteristics of local economic development, the construction of big data technology and application specialty and the training experience of big data specialty students in our college in recent years, the integration of "training" (single skill training, simulation training, comprehensive teaching training, post skill training, etc.) "research" (social service projects, vertical scientific research projects, intellectual property application) and "innovation" (innovative practice teaching, entrepreneurial experience teaching) is implemented to feed back the scientific research achievements of the teacher team into teaching. Schools and enterprises build typical teaching designs and cases, handouts or teaching materials, conduct in-depth enterprise research and optimize the personnel training scheme, Sign strategic cooperation on integration of industry and education with enterprises, explore new ideas on the training of information personnels in higher vocational colleges, promote the training of innovative and entrepreneurial personnels in the application of new technologies and the integration of industry, University, research and innovation, use back feeding means to promote the growth of students' technical skills, the improvement of teachers' R & D ability, the innovation and entrepreneurship development of teachers and students, and improve the training quality of big data technology and application personnels in higher vocational colleges,

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Boost schools to create high-level vocational colleges. The actual implementation of the project is shown in Table 1.

Table 1: Actual implementation schedule

Start-end date	Progress target requirements
2021.01 ~ 2021.02	Further read the relevant literature, track the frontier research in this field, analyze the data source, determine the data acquisition path and data acquisition range, and design a new system framework.
2021.3 ~ 2021.7	Comprehensively carry out literature research on relevant theories and key technologies at home and abroad, establish models, put forward relevant assumptions, make theoretical analysis on the designed model, carry out application research, and start to design the application.
2021.8 ~ 2021.10	Analyze and verify the results, draw confirmatory conclusions on the premise of ensuring the correctness and reliability of the conclusions, and summarize and reflect on the teaching cases.
2021.11 ~ 2021.12	Clarify the ideas, comprehensively summarize the results and complete the research.

6. Achieved Effect

After more than one year of joint efforts of all project members, the following goals have been basically achieved:

(1) Product personalization and customization will be a very important feature in the era of big data and artificial intelligence, which can meet the higher and higher training needs in the future.

In recent years, with the rapid development of science and technology and the rapid improvement of computing power, the theory and technology of artificial intelligence have become increasingly mature. At present, it has been widely used in finance, medical care, urban services, industrial manufacturing, life services and other fields. With the advancement of the era of artificial intelligence, today, where everything is about personalization, business management also pays attention to personalization. Then, AI systems, as enterprise management software, will naturally develop in the direction of personalization. More and more enterprises will become an important part of enterprise informatization construction, and also puts forward new requirements for AI systems. Therefore, personalization to meet enterprise management needs has become an unavoidable problem for AI developers. The "on-demand" AI development method will undoubtedly become AI management. Important trends in software development. Therefore, customized development has become an essential component in the process of implementing AI systems.

(2) Transform the scientific research achievements of the teacher team and apply them to the training process of artificial intelligence customized development personnels, so as to cultivate a large number of large software customized development technical personnels for the society.

In the process of introducing AI systems and applying AI systems, companies often encounter situations where AI systems cannot meet the actual management needs of the company itself or are inappropriate for business management. It is necessary to customize the development of existing AI systems. The so-called AI customization Development refers to: the corresponding

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SDK (software development kit) provided in the existing AI system development platform, for where the software functions are not applicable when the enterprise implements the AI system, custom development technicians based on the public API (application) provided in the SDK. Program interface) to access some of the original basic functions of the software, and according to the combination of these basic functions, expand and then form new functions to meet the special needs of users.

7. Conclusion

According to the goal of vocational education in the new era of the country, combined with the characteristics of local economic development, the construction of big data technology and application majors and the training experience of big data students in our college, in recent years, the implementation of "training" (single skill training, simulation practice training, comprehensive teaching training, job skills training, etc.), "research" (social service projects, vertical scientific research projects, intellectual property applications) and "creation" (innovative practice teaching, entrepreneurial experience teaching) is integrated, and actively explore suitable for higher vocational education. Education is a personnel training system that integrates teaching content, scientific research projects and curriculum system, practical teaching system, student innovation and entrepreneurship teaching system, teaching methods and means, etc. Through reform and practice, it can improve the professional skills and employment competitiveness of higher vocational students.

This project aims at the training of customized development personnels based on artificial intelligence, transforms actual scientific research cases into practical training topics of real projects, comprehensive teaching training, and carries out "training, research and innovation" integrating teaching construction and research, and cultivates a large number of people for the society. The much-needed AI custom development technical and innovative personnels have achieved the expected goals.

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