Research on the Training Mode of Artificial Intelligence Applied Talents in Higher Vocational Institute
——Take Guangdong Polytechnic Institute as an Example

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ABSTRACT

Artificial intelligence is the need of national strategic development. How to cultivate artificial intelligence applied technical talents is the primary task of higher vocational institutes. However, as artificial intelligence technology service is a new major, many higher vocational institutes have many problems in personnel training, curriculum construction, training conditions, teaching staff and so on. Based on the construction of artificial intelligence technology service specialty in Guangdong Polytechnic Institute, this paper explores and practices the cultivation of artificial intelligence applied talents.

Keywords: Industry education integration, Higher Vocational Institutes, Artificial intelligence applied talents, Training mode

1. INTRODUCTION

Artificial intelligence is a strategic emerging industry leading the future. The major developed countries in the world regard the development of artificial intelligence as a major strategy to enhance national competitiveness and maintain national security. On July 20, 2017, the State Council of China issued the development plan for the new generation of artificial intelligence, emphasizing that by 2030, China's AI theory, technology and application should reach the world's leading level and become the world's major AI innovation canter, which marks that the development of AI has officially risen to a high level of national strategy [1]. Under the background of the rapid development of artificial intelligence industry, China's demand for AI talents has exceeded one million. However, the supply of talents in the domestic AI field is very small, and there is a serious shortage of talents, which makes it more difficult for small and medium-sized enterprises to recruit. According to the relevant data, the biggest talent gap is the artificial intelligence application practice post [2]. Higher vocational colleges are the main force of cultivating applied talents.

The goal of higher vocational talents training is to cultivate technical and skilled applied talents. The integration of production and education integrates teaching links, enterprise production, quality training and skill training. It not only pays attention to the study of professional knowledge, but also trains relevant technical skills, so as to cultivate students' comprehensive ability. Previous studies have shown that the cultivation of applied talents must focus on the integration of industry and education, and the professional docking industry is the basic requirement of the integration of industry and education [3]. Taking higher vocational colleges as the main body, combining with enterprises with artificial intelligence talents and technical practice to carry out the talent training of deep integration of production and education is the main mode of artificial intelligence application-oriented talent training.

2. CURRENT SITUATION OF ARTIFICIAL INTELLIGENCE SPECIALTY IN HIGHER VOCATIONAL COLLEGES IN CHINA

In October 2019, the Ministry of education of China released the supplementary specialty catalogue of higher vocational education, and the artificial intelligence

technology service specialty officially entered the specialty catalogue of higher vocational education. In response to the national artificial intelligence strategy, higher vocational colleges respond positively. In 2020, 171 Higher Vocational Colleges in China will successfully apply for the major of artificial intelligence technology service. However, the artificial intelligence discipline has a short foothold in China, especially in the personnel training system and professional construction, which is still in the exploratory stage and faces a series of problems.

2.1. Unclear Talent Training Objectives

Some AI majors in higher vocational colleges are transferred from software technology, computer application technology and mobile application development. Most of the courses of artificial intelligence major follow the original professional courses, only a few new courses in the field of artificial intelligence are added, such as machine learning, deep learning, etc., and there is no curriculum system for the specific application of artificial intelligence. On the other hand, the demand of existing enterprises for artificial intelligence application posts is high, and there are not many enterprises recruiting higher vocational students, which also brings some confusion to the talent training of higher vocational colleges.

2.2 Lack of Teaching Resources

Higher vocational students attach importance to practice and neglect theory, like hands-on practice, and are keen on Project-based case study. However, the existing teaching materials and online resources are not in line with the characteristics of higher vocational education. At present, a lot of published textbooks are suitable for undergraduate colleges, which are theoretical and difficult for higher vocational students. A lot of online learning resources are also from the teachers of undergraduate colleges. The basic research theory accounts for a large proportion and is difficult. However, it is lack of targeted operation practice, which cannot meet the teaching and learning needs of the artificial intelligence specialty in higher vocational colleges [4].

2.3 Imperfect Training Conditions

Most of Higher Vocational Colleges share the original computer training room or implement the transformation and upgrading on the current basis, so the training practice environment is not perfect relative to the professional needs. Although the original computer training room can solve the practical problems of some courses, it cannot well meet the teaching needs of the artificial intelligence specialty, especially the lack of GPU computing power support for deep learning related cases, and cannot well match the practical training needs

of the artificial intelligence specialty, so it is difficult to provide a strong boost for the construction and development of the specialty.

2.4 Weak Technical Skills for Teachers

A lot of teachers of artificial intelligence major come from computer major. Artificial intelligence is an interdisciplinary, in addition to the traditional computer related theory and technology, teachers also need to be familiar with machine learning, deep learning theory and knowledge, familiar with computer vision, speech recognition, natural language processing and other application fields of knowledge and technology. Most of the teachers are not familiar with these related theories and knowledge, and lack of teachers who master the core technology of artificial intelligence and have the ability of industry application and practice.

3. EXPLORATION ON THE CULTIVATION OF ARTIFICIAL INTELLIGENCE APPLIED TALENTS IN HIGHER VOCATIONAL COLLEGE

Our institute is one of the first batch of higher vocational colleges that have been successfully approved for the major of artificial intelligence technology service, which has taken a solid step for the cultivation of application-oriented talents of artificial intelligence major. Through market research, enterprise exchanges and expert interviews, we understand the development status of the artificial intelligence industry and the demand for application-oriented talents, and initially build a talent training mode for the development of the artificial intelligence application industry.

3.1 Curriculum system for artificial intelligence professional post

This major aims to cultivate and master the basic knowledge and application technology of artificial intelligence, master the labelling, cleaning and processing process of artificial intelligence data set, have the technical skills of artificial intelligence data analysis, application system development, face the enterprises and institutions related to artificial intelligence industry and its application, and be able to engage in the development, data processing and analysis, and production of artificial intelligence application products Product marketing and technical support and other work of high-quality compound technical and skilled personnel. Table 1 shows the professional skills courses based on the analysis of typical work tasks and professional abilities.

3.2 Construct Multi-Dimensional Collaborative Education Platform for Industry，Enterprise and Institute

In order to play the role of Higher Vocational Colleges in serving the local economic and social development, the specialty setting must consider the development direction and dynamics of the local industry, and lead the industrial development while adapting to the needs of industrial development [5].

Table 1. Analysis of typical tasks and professional ability

Job position	Typical tasks	Professional ability	Professional skills courses
Data Cleaning and Labeling	Data Cleaning	1. Be able to complete the basic process of data cleaning independently, and be proficient in data extraction, conversion and loading.	Basis of Artificial Intelligence Application, Python Programming Foundation, Artificial Intelligence Data Set Processing, Python Basic Project Training
		2. Be proficient in using data cleaning tools.	
		3. Proficient in data cleaning, data verification, data conversion, data audit, data loading and other aspects of the basic application.	
	Data Labeling	1. Be able to label data skillfully according to the requirements. Through detailed classification, frame marking, point tracing and other operations on image, video, voice, text and other materials, label different labels to meet the needs of different artificial intelligence applications.	
		2.Proficient in data verification, quality review and other aspects of the basic application.	
Data Analysis and Application of Data Modeling	Data Analysis	1. Be proficient in using database and web crawler to collect public and professional datasets.	Python Web Crawler Technology, Database Technology, Data Analysis and Application, Machine Learning Foundation and Practice, Python Web Development, Artificial Intelligence Advanced Project Training
		2. Be able to skillfully use Python and combine with industry application to conduct data analysis and visual display skills.	
		3. Be able to write data analysis report according to the standard.	
	Application of Data Modeling	1. Be proficient in using common machine learning algorithms for data modeling and application in specific scenarios.	
		2. Proficient in using Python web framework to realize the visualization of AI application.	
Application and Development of Artificial Intelligence	Training of Artificial Intelligence Model and Application Development	1. Be proficient in using commonly used deep learning framework / platform.	Image Processing Technology, Machine Learning Foundation and Practice, Deep Learning Foundation and Practice, Computer Vision Technology, Artificial Intelligence Comprehensive Project Training
		2. Be able to call AI algorithm interface skillfully and complete application system development according to specific application scenarios	
		3. Be able to design artificial intelligence algorithm, and debug and optimize the algorithm	

Through the introduction of high-quality resources of industry, enterprise and school, promote the deep integration of industry, enterprise and school, build a multi-dimensional collaborative education platform of industry, enterprise and school, and innovate the training mode of artificial intelligence application-oriented talents. Focusing on "industrial application + talent training + achievement transformation", we will build a characteristic ecological chain of "production, learning and taking". Relying on this platform, we will carry out the training of excellent teachers, the cultivation of professional talents, the development of excellent resource courses, the construction of a series of teaching materials, the construction of practical training bases, and the development of vocational skill certificates, as shown in Figure 3-1.

3.3 Design of Teaching contents based on 1+X Certificate Pilot

1 + X certificate system is a new system design of

Figure 1 Multi-dimensional collaborative education platform for industry, enterprise and institute

vocational education, which will have a profound significance for the development of Vocational Education in China. Vocational education is employment oriented, training high-quality technical and skilled personnel, academic credentials cannot fully reflect the actual level of technical skills of graduates. After the implementation of 1 + X certificate system, X Certificate (vocational skill level certificate) carries the actual technical skill level of graduates [6]. Related research shows that computer vision application development is the most mature application in the field of artificial intelligence [2]. Our institute has selected the certificate of computer vision application development vocational skill grade of Baidu company, and integrated it into the professional talent training program, curriculum system, education and teaching mode, teaching organization and teaching implementation. Taking the primary certificate standard as an example, the basic mode structure of fusion is shown in Table 2.

Table 2. Professional courses and vocational skill level of computer vision application development (elementary, part)

Areas of work	Tasks	Vocational skill requirements	Professional courses
Visual Data Collection and Arrangement	1.1 Image Acquisition	1.1.1 Be able to use appropriate tools to crawl images from the network and other visual data.	Python Programming Foundation, Artificial Intelligence Data Set Processing, Python Web Crawler Technology
		1.1.2 Be able to download appropriate open visual class as needed.	
	1.2 Data File Arrangement	1.2.1 Python can be used to batch name the collected data files.	
		1.2.2 Python can be used to standardize the format of the collected data files in batches.	
Visual Data Labelling	2.1 Image Labelling	2.1.1 Understand various tools for image classification, image segmentation, image frame selection and image tracing point annotation.	Python Programming Foundation, Artificial Intelligence Data Set Processing, Image Processing Technology
		2.1.2 Understand the quality requirements of various labels.	
		2.1.3 Be able to ensure the quality and complete the labeling task efficiently by using appropriate tools according to the requirements.	
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4. CONCLUSION

In the context of the continuous promotion of digital economy, artificial intelligence has developed rapidly, and is deeply integrated with a variety of application scenarios. The landing and commercial development of artificial intelligence industry is gradually mature, and the number of artificial intelligence technical talents required by our society will also grow day by day. As an important training base for skilled talents in China, higher vocational colleges should pay attention to this social demand, deeply promote the integration of production and education, actively build a talent training mode, curriculum system and teaching resources to meet the demand of artificial intelligence application industry, and constantly improve teachers' knowledge level and vocational skills, so as to provide high-quality and high skilled compound talents for economic and social development Intellectual support.

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