

Reform of Talent Training Mode in Computer Major Under the Background of Artificial Intelligence

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ABSTRACT

The development of artificial intelligence technology promotes industrial transformation and upgrading, and the demand for artificial intelligence talents is also increasing. Local applied universities should give full play to their functions, cultivate talents urgently needed by society, and promote the rapid development of the regional economy. This article introduces the ideas and practices of the computer major of Xijing University in the training of artificial intelligence talents. Firstly, it clarifies the necessity of the reform of the talent training mode. Secondly, the current status of talent cultivation for computer majors is analysed according to the requirements of engineering education professional accreditation, and the problems that need to be solved in the training of artificial intelligence talents are identified. Finally, reform ideas and methods are put forward to provide reference for the reformation of artificial intelligence talent training mode in similar colleges.

Keywords: artificial intelligence, computer major, talent training mode

1. INTRODUCTION

In the 21st century, with the breakthrough of core algorithms, the improvement of computing power, and the support of massive data on the Internet, the development of artificial intelligence (AI) has made a great leap. Artificial intelligence has become the core driving force of strategic technology and a new round of industrial transformation, and it has become a new opportunity for social construction.

On May 16, 2019, President Xi Jinping pointed out at the International Conference on Artificial Intelligence and Education: Artificial intelligence is an important driving force leading a new round of technological revolution and industrial transformation. It is profoundly changing people's production, life, and learning methods, and promoting human society to usher in an intelligent era of human-machine collaboration, cross-border integration, and co-creation and sharing [1]. In September 2019, Shaanxi Province issued the Shaanxi Province New Generation Artificial Intelligence Development Plan (2019-2023), which greatly promoted the vigorous development of artificial intelligence enterprises, and the society's demand for artificial intelligence talents has shown explosive growth [2].

Therefore, local applied universities must give full play to their education functions, ease the contradiction between the supply and demand of artificial intelligence talents, and promote the rapid development of the regional economy. The computer major of Xijing University has always provided a large number of talents for the development of the western region. It should be used as an opportunity to reform and cultivate AI applied talents with innovative spirit and practical ability.

This article introduces the ideas and practices of cultivating artificial intelligence talents in the computer major of Xijing

University. First, the necessity of reforming the training mode of computer major is clarified. Secondly, it comprehensively analyses the current situation of personnel training in computer major. It finds out the problems that need to be solved by the requirements of engineering education professional accreditation. Finally, the reform ideas and methods are proposed from five aspects: talent training objectives, curriculum architecture, practical teaching conditions, teacher team construction and teaching quality evaluation mechanisms.

2. THE NECESSITY OF THE REFORM

2.1. The Needs of National AI Industry Development

After the State Council issued the "New Generation Artificial Intelligence Development Plan" in 2017, the AI software market has maintained rapid growth, reaching \$14.69 billion in 2019, and will maintain a compound annual growth rate of more than 133% in the next five years. As of the end of 2019, my country has initially formed a relatively complete AI industry chain, and some AI application software and terminal products have developed rapidly, initially showing an explosive growth trend [3].

The important foundation for the development of the artificial intelligence industry is the scale of professional talents. Especially after the country promotes the industrial integration of AI + traditional industries, the demand for AI application talents in various fields is even stronger, and the compound annual growth rate of talent demand exceeds 200%.

Under the general situation of the country's promotion of industrial transformation and upgrading, increasing the scale of training AI applied talents and enriching the types and levels of AI talents is the inevitable development of AI talent training.

2.2. The needs of Promoting Regional Economic Development

The vast majority of artificial intelligence enterprises in Shaanxi Province are small and medium-sized and start-ups. These enterprises have become the main force in the development of the artificial intelligence industry chain in our province.

At the same time, these companies take "AI + industry applications" as their main development direction, and their needs for AI talents mainly include: mastering basic technologies such as machine learning, machine vision, natural language processing and understanding machinery manufacturing, security, transportation and cultural creation.

At present, broadening the training channels for such AI application-oriented talents and expanding the scale of training is not only to solve the needs of enterprises but also an important guarantee for promoting regional economic development.

2.3. The Needs of Solving the Problem of AI talent Shortage

At present, the annual demand for AI talents in Shaanxi has exceeded 6,000. Among the more than ten small and medium-sized AI companies we surveyed, there is a general shortage of talents. The main manifestations are: "the high-end AI professionals cannot be recruited, nor are they needed", "the number of undergraduates majoring in AI is small. Local companies act as a springboard to develop in developed areas," and "undergraduates who are not majoring in AI are slow to get started and do not work." The prominent contradiction between talent supply and demand hinders the development of the artificial intelligence industry in our province.

3. PROBLEMS OF AI TALENTS TRAINING MODE

Xijing University actively responds to the State Council's "New Generation Artificial Intelligence Development Plan" and the Ministry of Education's "Higher Education Artificial Intelligence Innovation Action Plan", keeping up with the urgent needs of the new round of technological and industrial reform and development, and opening artificial intelligence in computer major. The direction has clarified the talent training positioning of "facing the economic development of the western region", and delivered urgently needed AI application talents to local small and medium-sized enterprises. However, compared with the rapid development of regional economy, AI applied talent training has the following shortcomings.

3.1. One-sidedness of Training Goals

The training goal is the top-level guidance for talent cultivation, the basis for the formulation of the curriculum syllabus, curriculum standards and other programs, and it is the basic follow of teaching.

The training goal of the computer major is "high-quality applied talents facing the economic development of the western region", which can adapt to "data mining, machine learning, computer vision and other artificial intelligence development and application work".

This training goal only emphasises the application of a single ability and cannot cultivate AI systems. This situation has caused one-sidedness of students' knowledge and abilities, and lack of adaptation to the integrity and comprehensiveness of the AI system. Therefore, compared with the development needs of the AI industry, the adaptability of training objectives is too narrow, which limits the social adaptability of AI talents.

3.2. Incomplete Curriculum Architecture

The original curriculum architecture is mainly based on computer majors. After setting the direction of AI in computer majors, only some courses were adjusted, without fully considering the integrity and systematicness of the curriculum architecture required for AI talent training.

These problems are mainly manifested in four aspects: one is the unreasonable class hours, the computer courses have higher class hour and the small amount of class hours of AI courses; the second is the unreasonable course connection, AI courses and foundations are sometimes offered simultaneously, and there is no correct distinction between basic courses and professional courses; third is the AI courses such as machine learning, deep learning require mathematical knowledge including discrete mathematics, probability theory and mathematical statistics, optimisation theory. These mathematics courses are not all included in the current curriculum architecture [4]; fourth, the optional courses are relatively single, and there are fewer courses in the AI application field, which cannot meet the requirements of the AI field for application ability. Therefore, students cannot choose the corresponding course modules according to their interests or their specialties, and their personalised development cannot be satisfied.

3.3. Weak support for Practical Conditions

The existing experimental conditions of the computer major are still mainly in the ordinary PC, which mainly supports the experimental teaching of programming courses, such as Java language programming, network programming, Python programming, computer vision and machine learning. However, AI course experiments also require hardware and embedded development platforms for method testing and algorithm verification. For example, computer vision courses need to use a moving car to transmit images in real-time, and machine learning algorithms must also be embedded in the hardware platform for on-site verification.

The lack of these experimental equipment affects the cultivation of students' practical and innovative abilities.

3.4. Unreasonable Enough of Teacher Structure

At present, all teachers of computer majors have undertaken scientific research projects, and the college has also hired corporate teachers and IT engineers to teach. These teachers provide strong support for the training of AI talents. Among these teachers, the proportion of teachers with a doctorate is as high as 75%, but only 15% of the teachers have a doctorate in computer or AI. Most teachers are engaged in the research of computer and AI-related application fields and lack systematic professional basic knowledge. These factors restrict teachers' teaching level.

3.5. Incomplete Teaching Quality Evaluation Mechanism

The existing teaching quality evaluation is implemented through organisational supervision, peer-to-peer lectures and student evaluation, forming a closed-loop evaluation. But the evaluation indicators are too rough, there are many qualitative indicators, and there is a lack of quantitative indicators and basis. The employment rate survey of graduates is not timely, and the continuity of the follow-up survey of job competency evaluation is not good enough.

4. REFORM IDEAS AND PRACTICES

We take AI applied talent training as the goal and take the engineering education professional accreditation standards as a guide to reform the computer major.

The ideas for the reform of the AI talent training model are in Figure 1.

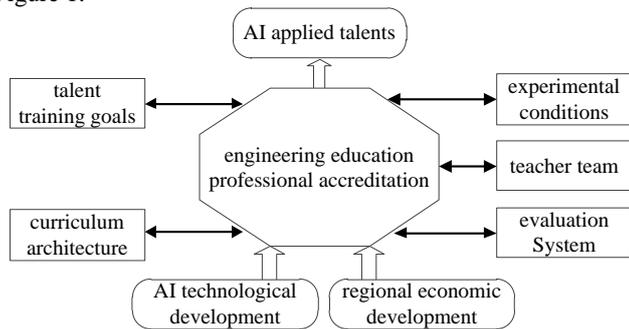


Figure 1 The ideas for the reform of the AI talent training model

The reform reflects three key points. One is to focus on students as the centre, lay a solid foundation for learning, tap expertise, and pay attention to individualized development. The second is to focus on output orientation, actively meet the needs of social and economic development and serve local and regional economic needs, optimise the curriculum architecture, and focus on practice and innovation ability training. The third is to

focus on continuous improvement, emphasising based on the existing quality assurance system, highlighting process evaluation, and continuous improvement based on the evaluation results [5].

4.1. Correct Positioning of Talent Training Goals

We conducted surveys of universities in Xi'an, clarified the differences in the orientation of talent training objectives of different universities, and learned the connotation of the collaborative development of computer science and AI. We surveyed 20 AI companies and clarified their requirements for AI talents. At the same time, we investigated the feedback from alumni of the three graduates to provide us with assistance in formulating graduation requirements [6].

Based on extensive research and demonstration, the training objectives of the computer major was revised to "applied engineering and technical personnel who can engage in equipment design and manufacturing, application development, operation and maintenance, technical management, etc. in the field of computer, artificial intelligence, machine learning or intelligent systems".

4.2. Reasonable Construction of the Curriculum Architecture

By the requirements of the engineering education professional accreditation standards, we have clarified the relationship between graduation requirements and training goals, and at the same time put forward clear requirements for curriculum settings, class hours and study distribution.

Curriculum architecture modularisation: we optimised the proportion of general courses, professional courses and practical courses. General courses added AI basic courses to lay a solid professional foundation; professional courses aimed at industry development needs and cultivated key abilities; practical courses focused on cultivating practical skills. At the same time, the ratio and credits of basic courses and AI professional courses were adjusted, and the ratio of theoretical courses and experimental courses was adjusted to make the curriculum system more complete and fully reflect social adaptability.

Curriculum setting individuation: professional courses and practical courses are set up in two directions of machine learning and intelligent systems to meet the individual needs of students and industry requirements. At the same time, three school-enterprise co-construction courses and two innovative practice course are set up in the curriculum architecture to provide a wider space for students' personalised development.

4.3. Vigorously Improve Practical Teaching Conditions

In 2019, our school increased its efforts to build practical teaching conditions, expanded two laboratories for embedded system design and computer network, built a new artificial intelligence application laboratory, and acquired robots, robot open research platforms and drones. There are a total of 50 sets

of experimental facilities such as vehicles, and a total of 500 sets of various experimental boxes, sensors, experimental development boards and modules have been purchased. These newly expanded laboratories provide a solid guarantee for AI talent training.

At the same time, our institute is expanding and improving other laboratories simultaneously, including big data analysis and processing platform, Internet of Things and big data technology platform and sensor laboratory. These laboratories can provide better support for systematic research on data acquisition, automatic processing and automatic identification.

4.4. Optimise the Structure of the Teaching Staff

The age structure, title structure, and proportion of professional and part-time professional teachers are reasonable, and teachers have strong engineering practice capabilities.

We take the following measures to improve the situation of unreasonable academic qualifications. First, encourage existing teachers to study for doctoral degrees in computer science, or go to well-known schools to study computer and AI professional doctors; second, plan to introduce 2 to 3 computer or AI doctoral teachers to enrich the professional teaching team. We also use a variety of methods to improve our teaching ability: one is to regularly hire experts and professors in the AI field to give lectures, the other is to have seminars between teachers and corporate engineers, and the third is to hire computer technical experts as part-time instructors in practice and cooperate with professional teachers in the school to improve professional teachers' professional practical ability.

4.5. Gradually Build a Teaching Quality Evaluation Mechanisms

The first is to adopt a process teaching quality evaluation mechanism, using teaching, learning, and multi-angle assessment, using students' learning to evaluate the teaching process and replacing paper exams with projects, programming, and competitions. These flexible assessment methods deepen students' understanding of knowledge and enable students to quickly adapt to corporate and social needs after graduation. Secondly, the follow-up evaluation mechanism is adopted. The college sets up a mentor tracking group, which is responsible for the graduation design of the students on the one hand, and on the other hand, tracks the work of these students after graduation, understands the problems and difficulties faced by the students in their work, and organizes these evaluation opinions and feedback to the next step in the revision of talent training. Finally, the focus of teacher evaluation is to use the performance of students to implement, such as using the guidance of the graduation design of students' progress, employment, work performance as the basis.

These teaching quality evaluation mechanisms all reflect the student-centred reform concept, enhance the school's sense of responsibility for cultivating talents to meet social needs, form a closed-loop teaching quality assurance and continuous improvement mechanism, and promote the continuous improvement of the quality of talent training.

5. CONCLUSION

In summary, local applied universities should explore talent training models with their characteristics, and cultivate applied talents with innovative spirit and practical ability.

In the context of the booming development of artificial intelligence, this article designs artificial intelligence talent training, explores and implements a series of reform measures, mainly including condensing talent training goals, formulating curriculum systems, practical teaching conditions, faculty, and teaching quality evaluation mechanism. These reform measures not only fully reflect the function of Xijing College in cultivating talents for the society, but also prove the responsibility of private schools to train talents according to regional economic development.

Preliminary practice shows that through the reform of the talent training model, students will be more inclined to the direction of artificial intelligence, the knowledge base will be more solid, the practical skills will be greatly improved, and greater development space will be provided for the future.

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