Research on AI Direction Construction of Data Science and Big Data Technology under the Background of New Engineering

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Abstract: Data science and big data technology are emerging hot professions, and many universities have gradually set up data science and big data technology. At present, the profession faces the challenges of large market demand, professional construction team and unsound curriculum system. Under the background of new engineering, how to use the industry as the starting point for talent training research is an urgent problem to be solved. In view of the above problems, this paper analyzes the status quo of big data professional construction, puts forward the research on the construction of artificial intelligence in data science and big data technology under the background of new engineering, and integrates the direction of artificial intelligence into the big data profession to build a talent training position. In combination with the local needs of Heilongjiang Province, the school-enterprise cooperation mode and the construction of the teaching staff will be carried out, thus effectively improving the quality of personnel training.

1. Connotation of New Engineering

Science and technology are the primary productive forces, the continuous advancement and development of science and technology, and the development of a new economic situation. At present, China's economic development is affected by new technologies and is undergoing continuous transformation. The Internet-centered technological industry changes are driving the development of new technologies and new economic models. In the new economic situation and the demand of the industry, in the face of the impact of the international situation, China's higher education has made new demands on the concept of innovative engineering education, the construction of engineering education disciplines, and the cultivation of talents. The new engineering construction is officially in this context. Produced by [1].

In order to cultivate a large number of outstanding engineering and scientific talents who will lead the future development of technology and industry, and provide intellectual support and talent guarantee for China's industrial development and international competition, in February and April 2017, the Ministry of Education held respectively at Fudan University and Tianjin University. The new engineering seminars of comprehensive universities and engineering universities have formed the "Fudan Consensus" and "Tianda Action" for the construction of new engineering. The move is to propose a "new engineering concept" in response to the new opportunities and challenges facing the new round of technological revolution and industrial transformation. The construction of "new engineering" is a strategic action to take the initiative to respond to a new round of scientific and technological revolution and industrial transformation. The new economy characterized by new technologies, new industries, new formats and new models calls for "new engineering", and a series of major national strategies are implemented in depth. Calling for "new engineering", industrial transformation and upgrading, and the transformation of old and new kinetic energy call for "new engineering", and upgrade the country's hard power and international competitiveness to call for "new engineering." On February 18, 2017, the Ministry of Education held a seminar on the development strategy of higher engineering education at Fudan University to discuss the connotation

characteristics of new engineering, the path selection of new engineering construction and development, and reached 10 consensuses. "Fudan Consensus" for the construction of "New Engineering". On April 8, 2017, the Ministry of Education held a new engineering construction seminar at Tianjin University to discuss the vision and actions of the new engineering construction, which was called the "big day action" for the construction of "new engineering". Through more than a year of construction, the "New Engineering" has achieved remarkable results. Focusing on the construction of new engineering majors, the Ministry of Education has not only approved new engineering majors such as big data, artificial intelligence, and cyberspace security, but also provided new ways to introduce new technologies for traditional engineering majors through the Collaborative Education Project of Industry, University and Research. The traditional engineering major has transformed into a new engineering major.

With the continuous development of network technology and informatization construction, some emerging technology industries and disciplines have also developed. Data science and big data technology are the requirements of current industrial development and are an emerging discipline. Big data and its related industries have gradually become an important part and driving force of the new economy. Therefore, cultivating qualified big data talents for the new economic development is the key to China's occupation of high-tech commanding heights in the new economic development. It is an important part of the new engineering construction. It is an important part of the new engineering construction. How to combine the new engineering concepts to carry out data science and The cultivation of big data technology professionals is a hot issue of current research and exploration [2].

2. Development and Research Status of Big Data Professional

The difference between big data and ordinary data is mainly the data set with large capacity, multiple types, fast access speed and high application value. Big data can collect, store and correlate data in a large number, scattered sources and diverse formats, and then discover new knowledge, create new value, enhance new capabilities, and provide technology and services for information construction and industry.

2.1. Foreign Development and Research Status

The foreign big data major developed from the data analysis major. In 2007, the University of North Carolina State University established a master's degree in setting up and traditional computer science and technology, software engineering, computer network technology, applied mathematics and Different from statistical analysis, big data technology starts from the bottom layer and abstracts the characteristic information outside the data surface layer, so as to make up for the weak links of the existing basic discipline research, carry out cross research with other industries and fields, and gradually develop into today's data science. Professional with big data technology. Since 2013, many famous universities such as Stanford University in foreign countries have successively opened data science and big data technology majors. The goal of professional training is to cultivate data collectors, data mining, data cleaning, data analysis and data visualization, and to train data scientists for cross-disciplinary research with other disciplines [3].

2.2. Domestic Development and Research Status

The State Council issued a notice on the implementation of the Action Plan for Promoting Big Data Development. Guofa [2015] No. 50 explicitly encourages universities to set up data science and data engineering related majors, and focuses on cultivating professional data engineers and other big data professionals. It can be seen that the profession is favored by colleges and universities, and it is related to the country's strong support for the development of big data industry and the shortage of talents in the industry. In recent years, China's data science and big data technology professions have also sprung up. In February 2016, Peking University, University of International Business and Economics and Central South University became the first universities to be awarded "Data Science and Big Data Technology"; in March 2017, 32 universities including Renmin University of China,

Beijing University of Posts and Telecommunications, and Fudan University As the second batch of colleges and universities approved the "data science and big data technology" undergraduate major; in March 2018, 248 colleges and universities such as Heilongjiang Institute of Technology was approved as the third batch of "data science and big data technology" undergraduate major; 2019 In March of the year, the Ministry of Education approved the filing of 203 colleges and universities to carry out the "data science and big data technology" talent training; during the four-year period, a total of 486 undergraduate colleges and universities were approved to carry out the training of talents in the profession. At the same time, higher vocational colleges are also actively applying for the application and approval of "Big Data Technology and Application". Since 2016, a total of 682 higher vocational colleges have been approved to carry out the training of "Big Data Technology and Application" professionals. . The training of talents in big data majors in Chinese universities is shown in Fig1.
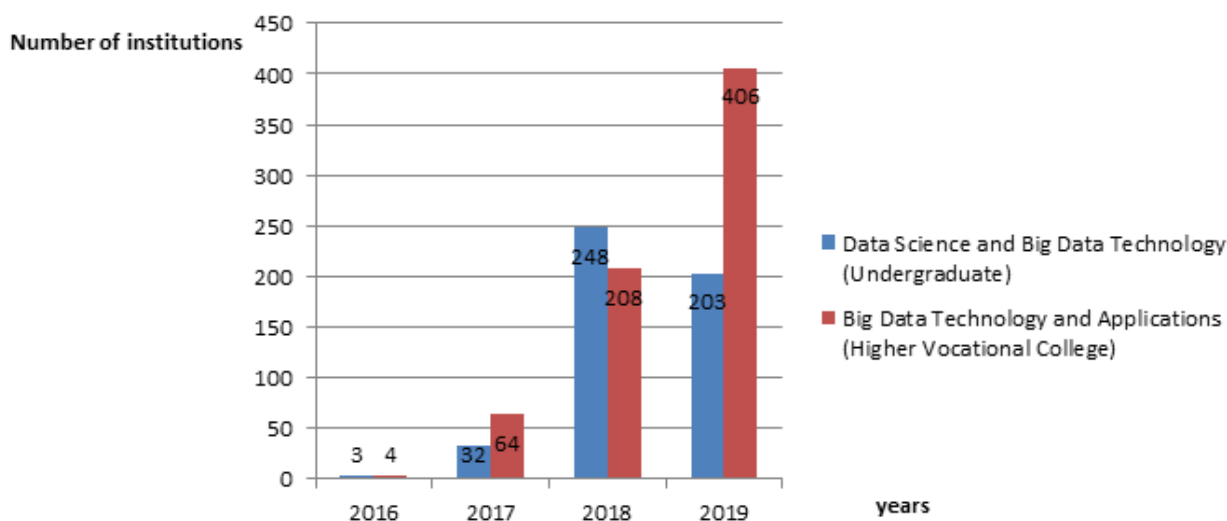

Fig. 1 Construction of big data majors in colleges and universities

The construction of data science and big data technology in China is still in its infancy. The construction was originally based on computer science, mathematics, statistics and other majors. There is no undergraduate graduate of this major. From the employment salary of big data professional, the entry salary of Hadoop development engineers has reached more than 8K, and the work can reach more than 1.2W in one year. Hadoop development engineers with 2-3 years of work experience can reach 300,000 to 500,000 annual salary. The employment of big data majors is concentrated in relatively large companies. Hadoop development engineers are the most urgently needed talents of BAT companies and big data companies. 10% of domestic IT, communications and industry recruitment are big data. Related, and the proportion is still rising. The huge talent gap directly leads to the recruitment of big data talents by high-income companies. The salary and salary of employment are shown in Table 1 below.

Table 1 Big data professional employment salary situation

Post	Monthly salary	Working years
Big data engineer	30K-60K	5-10 years
Spark/Hadoop Development Engineer	30K-60K	5-10 years
Big Data Development Technology Manager	30K-50K	5-10 years
Hadoop Architect	30K-50K	3-5 years
Big data engineer	25K-50K	3-5 years
Big data development manager	25K-40K	1-3years

According to the statistics of the China Business Federation Data Analysis Professional Committee, the gap in China's basic data analysis talents will reach 14 million in the future, and more than 60% of the positions recruited by BAT companies are recruiting big data talents. At

present, the number of big data talents is higher. Less, but in the data-driven future, the big data talent market is bound to grow larger, and now is just the initial stage of big data start. Data science and big data technology majors develop students' big data thinking ability and innovative ability. Therefore, in the teaching reform, we must closely focus on new engineering to train big data professionals who meet the needs of society [4].

3. Big Data Professional Positioning

At present, the training orientation of big data professionals is mainly based on the demand for talents, focusing on the cultivation of "talent with big data thinking, data analysis and data application" [5]. In the process of cultivating students, students are familiar with data acquisition, data storage, data analysis, data visualization and other technologies, with the ability to design, implement and maintain big data application systems, and to discover, analyze and solve practical engineering problems. At the same time, it has the ability to coordinate, communicate, organize and manage engineering projects, understand the development of data science, information technology and big data industry, and has the ability to continuously learn and adapt to development [6]. Combining with the characteristics of the school, in the new engineering background, around the direction of computer science and artificial intelligence, carry out the connotation construction of data science major, optimize the curriculum system, break the regular school-running mode, and rely on the school-enterprise cooperation unit to build a big data professional laboratory and The curriculum platform, the construction of the training base, in order to enhance the students' practical operational ability, the service place as the starting point, explore the talent training model of "big data + industry" demand [7].

4. AI Construction Direction

Cooperate with enterprises to build "Artificial Intelligence College", provide a real environment of practical training platform for professional construction and talent training, and become a platform for professional teachers to research and transform achievements and outstanding students.

Based on the existing professional group, the school and enterprise jointly build an artificial intelligence application innovation center as a teaching base. For the purpose of demand, we will build a curriculum system for artificial intelligence training, and innovate talent training mechanisms and management systems. Introduce the enterprise management model and concept in the teaching environment, student management process and talent cultivation process, so that students can complete the knowledge learning in the real environment and achieve the purpose of talent cultivation. The whole process focuses on the ability to cultivate and improve the overall quality of students.

In-depth cooperation in teacher construction and scientific research and innovation. To build a "double-skilled" faculty including enterprise engineers, enterprises can train first-line teachers for schools, hire enterprise engineers with teaching ability to serve as first-line courses, and make full use of the effective resources of schools and enterprises to enable teachers' practical teaching. Capacity building can keep up with the development of the industry front, and with the help of the practical environment provided by enterprises, guide teachers to carry out scientific research and improve the scientific research and innovation ability of the teaching staff[8].

Focus on schools and cooperative enterprises, and cooperate with related artificial intelligence enterprises to jointly carry out relevant cooperative research on artificial intelligence related core technologies, local enterprises and surrounding enterprises in the process of transformation and upgrading, and formulate industry intelligent solutions to provide enterprises with Technical support, gradually form the innovation ability and innovation team of school-enterprise cooperation; provide corresponding technical services for local economic development to provide consulting, training, innovative research, technological transformation and other processes, and better grasp the local economic development needs and technology development trends In order to guide the artificial intelligence college to better integrate into the local economic construction in talent training, form a

virtuous circle of talent training, and contribute to the economic construction and various developments in the Heilongjiang region and the northeast region[9].

5. School-Enterprise Cooperation Mode

The Heilongjiang Institute of Technology and Dana Group jointly established the Management Committee of the Artificial Intelligence College. The members are composed of school leaders and college leaders, Dana Group, local government departments and industry leaders, and project implementation college leaders. The proportion of off-campus personnel is not low. At 40%. The board of directors is mainly responsible for the development, decision-making and guidance of the Institute of Artificial Intelligence, and the school participates in the management and related teaching work. At the same time, the school set up a college and 1 person as the contact person, responsible for the coordination and coordination of the artificial intelligence college. The Management Committee of the Artificial Intelligence College establishes corresponding management regulations, establishes a standardized project management system, performance evaluation system, incentive policy measures, and course effectiveness evaluation mechanism to ensure the development of the characteristics of the artificial intelligence college and the quality of higher personnel training. The committee handles daily work in accordance with the principles of mutual respect, mutual understanding, active consultation, and democratic decision-making.

Heilongjiang Institute of Technology is mainly responsible for providing the site resources, funding, teaching and management personnel required for teaching and office, organizing student management, teaching operation management, etc. The Dana Group is mainly responsible for the selection and training of the teaching staff. The introduction of actual production projects or production environments, the development of experimental training, etc.; the two sides jointly participate in the formulation and improvement of personnel training programs, and the construction of curriculum teaching resources. Heilongjiang Institute of Technology and Dana Group carried out in-depth and all-round cooperation in accordance with the model of "co-construction and sharing". In the process of cooperation, the two sides have invested in their respective advantageous resources in the areas of professional teaching, personnel training, and social services in the principle of mutual benefit and mutual benefit, sharing benefits, and cultivating qualified personnel for local governments to contribute to local economic development.

6. Construction Plan

Based on the existing software and hardware conditions, our school is based on the Jixi area, facing Heilongjiang Province, radiating the surrounding areas of Northeast China, serving the construction of "One Belt and One Road", and exploring the "Artificial Intelligence + Green Agriculture" composite talent training mode. On the basis of cooperation with the "Institute of Artificial Intelligence", the Inner Education and Education Group will further enhance the function and scale of the Artificial Intelligence Application Innovation Center in the next three years in accordance with the needs of talent development.

Integrate the Artificial Intelligence Application Innovation Center and build an artificial intelligence college. The center consists of Intelligent Manufacturing Application Innovation Center, Modern Electronics and Communication Engineering Application Innovation Center, Intelligent Robot Engineering Application Innovation Center, and AR/VR Application Innovation Center. It is mainly for electrical engineering, data science and big data technology and software. Technology, computer network technology, software technology, intelligent science and technology related majors, in which the relevant facilities provided by schools and enterprises can not only provide services for the students of the school, but also provide personnel training, technical support and related related enterprises around Jixi. Application training. The Intelligent Manufacturing Application Innovation Center is mainly responsible for practical training in the fields of mechanical manufacturing technology, advanced manufacturing technology and intelligent manufacturing technology. The Modern Electronics and Communication Engineering Application Innovation

Center is based on the design of modern electronic systems. The whole network of communication network training system is used as the information transmission platform. Combined with "Internet +", it can complete the network planning, construction and maintenance of the whole network. , business development and other network training; complete various types of application electronic system development and design training; complete intelligent IoT application design, mobile APP development, smart home (smart community, smart factory, intelligent production) design; intelligent robot engineering application innovation Establish a variety of robot development training experimental environment for different applications of robots in daily social production and life, meet the needs of students' internship training and innovative training from different levels, and create conditions for teachers' research and robot application development, AR/VR applications. Innovation provides a virtual reality experimental training environment that can simulate some simulation environments in related fields[10].

Speed up and strengthen platform construction. Cooperate with Dana Education Group to build a resource integration platform, use the cloud computing resources of Dana Education Group to establish basic data supporting the development of artificial intelligence industry in Jixi and surrounding areas, and build agriculture, coal, literature, language, images, videos and maps. A large number of data training resources and standard test data sets; integrate data resources in various fields, promote public service platforms, innovative enterprises to strengthen cooperation, pool artificial intelligence innovation and entrepreneurial resources, and provide innovative and entrepreneurial services. Improve the application technology of artificial intelligence. Advance the deep integration of artificial intelligence technology and robot technology.

According to the enrollment status of the Artificial Intelligence College, continue to increase investment, use the advantage resources of Dana Education Group, and strive to build an application innovation center that supports not less than 200 students to carry out relevant experimental work in three years.

Strengthen the construction of the "double-type" teacher team. On the basis of improving the teaching ability and scientific research service ability of full-time teachers, we pay attention to the cultivation of engineering practice and innovation ability. Relying on the Innovation Center, we will arrange 2 to 3 teachers to study and participate in enterprise production practice, teaching and training, technical services and other activities on a regular basis, or directly to the company to form a "double-double" with high professional level and strong practical ability. The ability to "feature" the teaching team.

Improve the scale and quality of the talent team through the "external introduction and internal training" measures. The school plans to improve the quality of the talents of the intelligent manufacturing application innovation center by introducing high-level highly educated professionals and academic qualifications to improve the training plan and the post-school-enterprise cooperation and scientific research and innovation project training.

Strengthen the construction of part-time teachers. From the inside of the enterprise, hire technical experts and engineering technicians who have certain theoretical level and rich practical experience to serve as part-time teachers in the school, and undertake courses with practical requirements and vocational guidance courses. The school and enterprise jointly develop and improve the employment management system for part-time teachers and its implementation methods, and form a relatively stable team of high-quality, high-skilled part-time teachers.

7. Conclusion

Heilongjiang Institute of Technology plans to rely on the Department of Electrical and Information Engineering and Dana Times Technology Group Co., Ltd., Beijing Huayu Xingye Harbin Branch and other enterprises to build an artificial intelligence college, which combines data science and big data technology, electrical major, mechanical specialty, The advantages of computer science, mutual integration, the construction of AI direction based on big data, innovative teaching mode, for the regional economy to cultivate "artificial intelligence + agriculture" application, compound, innovative talent.

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