The Enlightenment of AI Development Process of China and the US to Chinese University Education

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Abstract: By reviewing the development process of AI in China and the United States, it is found that China and the United States invest differently in AI, research and development, and application planning in different stages. The United States has gone through the accumulated resource accumulation stage of artificial intelligence and is entering the stage of maintaining its global leadership. China is down-to-earth, gradually developing and enriching all directions in the field of artificial intelligence. Through comparison, drawing on the development experience of Chinese and American countries, it is proposed that the development of AI education in Chinese universities should focus on the integration of ecology, highlighting three key points: first, optimize AI development policies and strategies, and mobilize all departments for the construction of the disciplines and courses; second, focus on the informatization and artificial intelligence; third, train college students and construct basic theoretical talents and "artificial intelligence + X" compound talents.

1. Introduction

Artificial intelligence is a strategic technology leading a new round of scientific and technological revolution and industrial transformation, and it has a leading goose effect with strong spillover drive. Driven by new technologies such as mobile Internet, big data, supercomputing, sensor networks, and brain science, artificial intelligence has accelerated its development, showing new features such as deep learning, cross-border integration, man-machine collaboration, group openness, and autonomy, and as a subversive force for a new round of global economic and social development and international competition, it will reconstruct the future competitive landscape. The development of ARTIFICIAL intelligence occupies an important position in the overall national strategy of China and the United States. The government's layout planning of artificial intelligence has a profound impact on the country's overall military, economic, social life and other aspects. After years of AI development, the Government of the United States launched a new round of AI development plan marked by the signing of the Trump Administration of the Executive Order to Maintain the US Leadership in the Era of Artificial Intelligence in 2019. The US AI Plan establishes the of AI in five areas: investment in research and development, resource release, standards setting, talent training and international cooperation. In December of the same year, the third China Artificial Intelligence Law and Ethics Forum was held in Chongqing. In China, in recent years, artificial intelligence has been rapidly developed and iterated in all walks of life, and artificial intelligence efficiently enables the manufacturing and service of enterprises. In the process of rapid development of technology, the Chinese Society of Artificial Intelligence and other relevant organizations have also put forward corresponding norms on the AI supervision of many domestic enterprises.

The development and prosperity of AI education is crucial. Talent training in the field of artificial intelligence is a new track. How to be in a dominant position in this track? We should rely

on AI education in colleges and universities to lay a solid foundation and make flexible adjustments. Since 2015, The State Council proposed "Made in China 2025", "artificial intelligence" has begun to promote the development of manufacturing industry as a new technology direction. The development of the industry needs talents, technology, equipment and other factors. It is necessary to vigorously cultivate talents in the field of artificial intelligence and promote the development of artificial intelligence education in universities. After the State Council issued the report on the Development Plan for the Development of the New Generation of Artificial Intelligence in 2017, the Ministry of Education and other ministries and commissions have issued various policies to promote the training of talents in the field of artificial intelligence. As an extremely important part of talent training, colleges and universities affect the development direction of artificial intelligence. In different periods and situations of the development of the field of artificial intelligence, it is necessary to adjust the education programs flexibly to cultivate suitable talents.

2. AI development process in China and the US

2.1. AI Development in the United States

During his administration, Trump signed the US AI landmark document, "Executive Order to Maintain the US Leadership in the Era of Artificial Intelligence", which elevated the US AI technology development strategy as the key to maintain its global leadership. The US government has strongly advocated maintaining its leadership, and has invested a lot of efforts to strengthen the management and development of the AI field. The US government has issued more and more policy reports on AI, including basic research, scientific research investment, military intelligence and other fields. Private AI companies in the United States have developed on a large scale and accumulated earlier.

Table 1 American Artificial Intelligence file.

Release Time	Release Department	Filename
In February, 2019	Oval Office	The Executive Order to Maintain the Leadership of American Artificial Intelligence
In June, 2019	The Special Committee on Artificial Intelligence	The 2019 National AI Research and Development Strategic Plan
In February, 2020	The White House Office of Science and Techno-logy Policy	The American Artificial Intelligence Program: 2019 Annual Report
In October, 2020	The National Security Council for Artificial Intelligence	The Draft Interim Report of the National Security Council on Artificial Intelligence
In March, 2021	The National Security Council for Artificial Intelligence	The National Security Council on Artificial Intelligence: The Final Report

2.2. AI development in China

Since the State Council issued a new generation of artificial intelligence development plan, government departments at all levels began to concentrate, adjust strategy, through the construction and development of artificial intelligence discipline, teachers and cultivate outstanding college students, to gain the initiative in global competition, and the artificial intelligence education strategy rise to the height of the national strategy.[1] The government, universities, research institutes and enterprises actively participate in talent training. By innovating the artificial intelligence talent training mechanism and taking the integration of industry and education, they will build a new community of industry, education and research, and develop a co-training mode of industry-university and research institutes with the participation of multiple subjects. [2]

According to the of the 2021 White Paper on the Development of ARTIFICIAL Intelligence, the scale of China's core AI industries reached 325.1 billion yuan in 2020, up 16.7% year on year. It will have a profound impact on the development of the real economy, overall social progress and the improvement of people's living standards, and help accelerate the transformation of China's

agricultural, manufacturing, transportation and other industries. As an important driving force and key technology for the development of digital economy, the development pace of artificial intelligence is gradually accelerating, in order to obtain the high opportunity point of a new round of scientific and technological revolution.[3] According to the of the 2022 AI Development White Paper, the scale of China's core AI industries will reach 341.6 billion yuan in 2021, and the amount of financing in AI will increase to 244.22 billion yuan, with 821 cases. China is standing on the new level of the 14th Five-Year Plan. Artificial intelligence, as the core driving force of the new round of scientific and technological revolution and industrial change, is promoting the development of the economy and society to digitalization and intelligence.[4]

Table 2 china Artificial Intelligence file.

Release Time	Release Department	Filename
In May, 2015	the State Council	Made in China 2025
In July, 2017	the State Council	The Development Plan for the New Generation of Artificial Intelligence
In August, 2021	China Institute of Electronic Technology and Standardization	The White Paper on Artificial Intelligence Standardization (the 2021 edition)
In April, 2022	China Academy of Information and Communications Technology	The White Paper on Artificial Intelligence (2022)
In July, 2022	The Ministry of Science and Technology and other six departments	The Guiding Opinions on Accelerating Scene Innovation and Promoting High-quality Economic Development with the High-level Application of Artificial Intelligence

3. Enlightenment to Chinese college education

3.1. Implications for the construction of AI discipline

3.1.1. Discipline and professional construction

The construction of AI disciplines and majors in Chinese universities and research units is rapidly advancing, because the AI discipline system is very large, and it is a multidisciplinary integrated subject, and the segmentation direction is very broad, which needs to be accelerated with the support of external forces. By building the ecology of the discipline of "industry-university-research integration", breaking through the key and difficult topics in the actual production environment, and integrating the key and difficult disciplines into the production practice of enterprises, it will greatly increase the enthusiasm of workers for scientific research and achieve efficient output, and help the discipline of artificial intelligence to move towards the development of high-level and strong practice.[5] Through specific cooperation projects with enterprises, the introduction of top talents to help improve the discipline system of artificial intelligence, and promote the construction of first-level disciplines in the field of artificial intelligence.[6]

3.1.2. Curriculum content reform

Under the background of the digital strategy of education digitization in China, it is necessary to accelerate the reform of subject curriculum. Curriculum is the main carrier to achieve the goal of talent training, and the quality of curriculum directly determines the quality of talent training. The development of artificial intelligence discipline should be constructed around the modularity points of intelligence, data and new system.[7]Centering on the document of "Several Opinions on the Construction of" Double First-class "Universities to Promote Discipline Integration and Accelerate the Training of Graduate Students in the Field of Artificial Intelligence" released in 2020, intelligence, data and integrated characteristics will be integrated into the discipline construction, so

as to create integrated intelligence +, data +, course content and enrich the connotation of disciplines.[8]

3.2. Enlightenment for the construction of university teachers

3.2.1. The innovation mechanism of the cultivation mode

In order to further promote the integration of artificial intelligence and other new technologies with the construction of teachers, the Ministry of Education launched the second batch of pilot projects to boost the construction of teachers. For how to establish the artificial intelligence teaching team in colleges and universities, we should carry out teacher intelligent training courses to improve teachers' intelligent education literacy. In universities, the indicators of scientific research projects and papers are set up to deepen the professional ability of AI teachers.[9] Focusing on the innovation mechanism of teacher training mode, because the artificial intelligence major has a strong practicality, it is necessary to comprehensively consider and train the practical operation of teachers. The artificial intelligence industry is updated in real time, and the technology iteration is rapid. Only when teachers actively adapt to the new technological changes such as informatization and artificial intelligence, can they better carry out active and effective education and teaching, and complete the targeted talent training.

3.2.2. Teaching resource support

Establish a school-enterprise cooperation mechanism, and focus on the introduction of talents from enterprises or professional institutions in the fields of information technology and artificial intelligence. Specifically, it includes actively introducing enterprise production engineers as ai practice mentors for college students. At the same time, it actively introduces the hardware equipment and software resources required by the subject, so as to help solve the problem of "difficult lesson preparation and difficult practice" for university teachers in the process of carrying out artificial intelligence teaching practice.[10] Taking machine learning and deep learning as an example, the scientific research and application of artificial intelligence rely heavily on data and computing power. If there is a lack of industry data set and hardware support in the teaching process, the teaching development will be seriously blocked. Therefore, the introduction of teachers should go hand in hand with the building of a platform for teaching practice and project development.

3.3. Enlightenment for cultivating college students

3.3.1. Training of artificial intelligence compound talents

Since the establishment of AI School in Tsinghua University in 2019, universities have actively paid attention to the training of compound talents in AI education courses, and strive to build a training system that attaches equal attention to basic theoretical talents and "artificial intelligence + X" compound talents. Cultivate students' ability of cross-learning between AI subjects and other subjects, consolidate the basic theories, and master the rapid acquisition of interdisciplinary knowledge and generic technology. With specific research direction as the goal, cultivate students' interest in learning and drive students to explore the unknown, such as intelligent manufacturing, robots, unmanned driving, intelligent medical care, machine translation and other directions.

3.3.2. Improve in practical practice

At present, the ai learning environment in China is strong and rich in resources. College students should seize the opportunities of The Times, improve their own ability, and make full use of all kinds of AI Studio, such as Baidu flying pulp platform, Ali Tianchi Competition, Tencent Laboratory and other network resources, to learn and practice and strengthen their professional ability. Colleges and universities should actively organize subject discussion activities, establish artificial intelligence practice and practice bases, encourage students to actively participate in offline discussion and enterprise practice work, improve technology in practice, and recognize the application of technology in the real production environment.

Table 3 china Artificial Intelligence education file.

Release Time	Release Department	Filename
In April, 2018	ministry of education	The Action Plan for Artificial Intelligence Innovation in Colleges and Universities
In May, 2019	Tsinghua University	Tsinghua University has set up an artificial intelligence school class
In February, 2020	ministry of education National Development and Reform Commission	Several Opinions on the Construction of "Double First-class" Universities to Promote the Integration of disciplines and Accelerate the Training of Graduate Students in the Field of Artificial Intelligence
In September, 2021	ministry of education	We will implement the second batch of ai actions to boost the construction of teachers
In December, 2022	ministry of education	The International Conference on Artificial Intelligence and Education

4. Summary

Through comparative analysis of policy strategy and development status, this paper finds that China and the United States have their own characteristics in the process of AI development. In general, both the two countries have introduced a series of national strategic plans to coordinate their development in the form of document guidance. For the United States, more emphasis has been placed on coordinated development through various parties. For China, the central guidance document is issued, and the government unit at all levels conducts overall development from top to bottom according to the field situation. But they all emphasize the importance of developing AI in the field of education. Chinese colleges and universities should do a good job in the education and training of cognitive intelligent talents and ecological construction. From the development process of AI in the two countries, we can sum up the experience and pave the way for Chinese universities to rationally allocate resources to vigorously promote the development of AI education.

Acknowledgements

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