

New Liberal Arts Talent Training under the Background of "Artificial Intelligence+"

Zhijian Wang^{a,*}, Zhibin Yang^b and Hua Yin^c

Information School, Guangdong University of Finance & Economics, Guangzhou, Guangdong, China

^azjian@gdufe.edu.cn, ^b1811680417@qq.com, ^cyinhua@gdufe.edu.cn

*corresponding author

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Abstract: The promotion of new technologies, the generation of new demands, and the requirements of new national conditions have spawned the upsurge of new liberal arts. As a strategic technology leading a new round of scientific and technological revolution and industrial transformation, artificial intelligence has opened a new door for research in many fields of new liberal arts. This article discusses the relationship between the new liberal arts and modern information technology, the application of artificial intelligence technology in the research of new liberal arts, analyzes the combination of artificial intelligence and the new liberal arts field, and discusses the new liberal arts talent training model based on teamwork. Cross-integration is an important direction of the reform of the new liberal arts, which enables students of the subject to have modern science and technology literacy.

1. Introduction

The construction of the new liberal arts has attracted the attention of the education circle and all walks of life in the past few years. This question is important because it is related to the important question of what kind of talents should be cultivated in the humanities and social sciences, and how to train them. It is also directly related to the question of how the humanities and social sciences adapt to social development and transform themselves.

Natural science focuses on solving the problem of "what", while human science focuses on solving the problem of "what should be"[1]. During the development of disciplines, it is constantly differentiated, professionalized, and continuously crossed and reintegrated. The current humanities and natural sciences are disconnected from each other due to the differentiation, but if humanities research lacks the scientific spirit of natural sciences, its conclusions and values also lack a solid foundation. The development of humanities in modern society increasingly needs the support of natural sciences. The cross integration of humanities and natural sciences is to gradually break the existing boundaries between disciplines, transform and upgrade traditional disciplines through cross integration, and realize method innovation and theoretical innovation.

Hiram College of the United States first proposed the "New Liberal Arts" in 2017. They reorganized traditional liberal arts and crossed the arts and sciences, that is, integrating new technologies into philosophy, literature, language, and other courses to provide students with comprehensive interdisciplinary learning. They hope to realize the purpose of knowledge expansion and innovative thinking cultivation through this reform [2]. The guidance of the Ministry of Education pointed out that the new liberal arts should form interdisciplinary subjects around the applied subjects represented by information science, and promote the intersection of philosophy and social sciences, natural sciences, and engineering technology.

Today's massive amounts of information and data affect human life all the time. In the context of dataization, the original research methods in the humanities and social sciences can no longer meet the needs. Big data analysis, processing, and mining technologies provide new processing methods

for them, which can be used to solve problems that were difficult to solve by traditional research methods before, and provide effective means for in-depth exploration in these fields. Some scholars believe that in the future, liberal arts students should be able to master new analysis tools and be able to master a programming language as proficiently as a foreign language. The development of big data, cloud computing, artificial intelligence and other technologies has made the theory and practice of digital humanities a boom.

2. Support for the New Liberal Arts by AI

Artificial intelligence technology has played important functions in the fields of science and technology, daily politics, economy, and society, and has had a long and profound impact on our lives. In recent years, with the development of artificial intelligence technology, speech recognition, face recognition and image analysis and processing have all made great progress. Artificial intelligence technology has also begun to directly serve scientific research. However, all kinds of traditional academic information resources are basically presented in digital form. Traditional academic search engines are slow to update and the search results are low in relevance. It is also difficult for researchers to obtain the literature information accurately and timely they need.

Intelligent academic search provides researchers with a convenient way to search for academic literature in many disciplines and data sources. With the continuous introduction of artificial intelligence (AI) technology, the functions of academic search products have become stronger and smarter. At the same time, academic search products incorporating AI technology have also become a major development trend. The intelligent academic search engine can not only realize intelligent information acquisition, personalized search and push based on user preferences, but also can deeply understand the basic content of document information, capture information that meets their needs for users, and greatly improve the efficiency and quality of information retrieval. It can realize personalized service. The rise and application of artificial intelligence technology provides new methods and directions for humanities and social science research.

The core technology of academic search in the future will be based on knowledge fusion, with knowledge processing technology and intelligent mining algorithm as the technology-driven dual engine, to develop more scientific and technological innovation and intelligent applications. Academic search products can be divided into two categories: open data and services, such as Google Scholar, Microsoft Academic, and Semantic Scholar; and specialized databases and services, such as Web of Science, Scopus, and CNKI.

The main artificial intelligence technologies currently used by academic search engines include the following [3]:

- 1) Information extraction introduces technologies such as machine learning, deep learning, and artificial neural networks.
- 2) User interaction introduces technologies such as natural language processing NLP and semantic analysis.
- 3) Author identification technology, naming disambiguation technology.
- 4) NLP, artificial neural network, knowledge base management and other technologies are introduced into information integration.
- 5) Information retrieval introduces technologies such as the construction of knowledge graph models and computer vision retrieval models.
- 6) Collaborative filtering algorithms, knowledge management, data mining, intelligent recommendation, machine learning, deep learning and other technologies are introduced in the literature or author recommendation.
- 7) Sorting and paper influence evaluation introduces sorting learning, deep learning, natural language processing, machine learning and other technologies.

3. Combination of AI and New Liberal Arts

The intervention of digital technology and methods has pushed the humanities to a new level of

cross-integration. Scholars from data science, network science, cognitive science, statistical science, and engineering science will join hands with humanities and social sciences to solve important issues we care about. The intersection of different disciplines is bound to provide new solution of many humanities and social sciences. At the same time, the further development of artificial intelligence is not just a matter of science and technology, it involves ethics, law, and the future of human society. When artificial intelligence technology is increasingly changing the existing order and rules of human society, humanities and social scientists are needed to participate in research and pre-judgment, and to study the positive or negative influence that artificial intelligence technology may bring to the future of human society [4].

Artificial intelligence is currently widely used in the financial field. Thanks to the large-capacity and accurate historical data and quantifiable characteristics of the financial field, it is very suitable for combining with artificial intelligence technology. At the same time, because we currently have strong computing power and convenient and easy-to-use machine learning tools such as TensorFlow, the core technology in the field of artificial intelligence, namely machine learning, is very convenient in the application of financial technology, from approving loans to managing assets, and then to risk assessment. The role of machine learning in the financial ecosystem is becoming more and more indispensable. For example, robot-advisor is a machine learning algorithm that can automatically adjust the financial investment portfolio according to the customer's income goals and risk tolerance.

Legal artificial intelligence refers to the application of artificial intelligence technology in law, and its goal is to fully improve the effectiveness of the rule of law. The existing legal artificial intelligence system can partially realize automatic legal reasoning, which greatly improves the effectiveness of work and the fairness of procedures. The key to legal artificial intelligence lies in the realization of automatic legal reasoning. There are three possible legal reasoning modeling schemes: one is the rule reasoning scheme, which uses deductive reasoning to encode legal norms into a legal interpretation database and a case fact database to achieve automatic legal deductive reasoning; The second is the case-based reasoning scheme, which uses analogy reasoning to encode cases into a legal interpretation database and a case fact database to realize automatic legal analogy reasoning; The third is the data reasoning scheme, which uses inductive reasoning to encode valuable legal information into a legal interpretation database and a case fact database to realize automatic legal big data reasoning. Legal robots are a type of customer-oriented legal artificial intelligence applications that are used to automate specific legal tasks, such as document automation and computer-aided legal retrieval. From intelligent search robots, form program robots to legal consulting robots, the user interface of legal robots are variety [5].

The cultivation of artificial intelligence talents should be a combination of humanities and social sciences and artificial intelligence-related professional and technical talents. In the future, the cultivation of humanities talents in artificial intelligence is to cultivate many innovative professionals who are based on artificial intelligence knowledge and skills and possess liberal arts thinking and literacy. They are liberal arts professionals who are good at learning, willing to cooperate, have the courage to explore, and actively practice. Universities need to build an "artificial intelligence +" liberal arts talent training system. At the same time, it is also necessary to train a part of scientific research talents with the social, economic, political, and cultural influence of artificial intelligence as the research direction.

The development of new liberal arts should promote the deep integration of big data, artificial intelligence and other information technologies with humanities and social science research. In undergraduate education, we should also pay attention to the deep integration of modern information technology and teaching, explore networked, digital, intelligent, and personalized education, promote the formation of a new form of "Internet + higher education", and use modern information technology to promote the quality of higher education. Information technologies such as artificial intelligence, big data, and the Internet have greatly changed the methods of learning and education, and have provided efficient and convenient tools for the construction of new liberal arts.

4. Teamwork Training

The new liberal arts pose an unprecedented challenge to teachers' competence and encourages us to continuously update our knowledge structure and improve our teaching ability. One of the ways to meet the challenge of training new liberal arts talents in the context of artificial intelligence + is to establish a team of mentors [6-7]. The mentor team is a team of mentors composed of a few mentors with different academic backgrounds and expertise in order to cultivate innovative talents. The mentor team is usually used for postgraduate training, but under the current situation, with the continuous advancement of interdisciplinary integration, undergraduate training can also introduce the mentor team model.

The mentor team is a team with complementary knowledge and collaboration. Each mentor has his own research direction and research perspective. Teams of tutors from different disciplines can gather professional knowledge of different disciplines, and the scope of penetration between disciplines is expanded. After studying with different tutors, graduate students can learn different research methods and content in related disciplines, and broaden their knowledge. The collision of multidisciplinary ideas has mobilized the interest and enthusiasm of students, and the field of knowledge is constantly expanding, making up for their own shortcomings, and improving the shortcomings of the narrow knowledge and fixed thinking of the single tutorial system. The process of knowledge fusion is conducive to cultivating students' independent thinking ability, judgment ability and innovation ability. The postgraduate training model based on the guidance of the mentor team is also helpful to the development of team mentors, especially the development of team young mentors. Young mentors can quickly improve their own guidance level by learning from senior mentors who have rich experience in graduate training in the team. Shanghai International Studies University has formed a team of experts in the fields of corpus translation, corpus linguistics, computational linguistics, computer science, language intelligence, etc., and built a multilingual corpus for national and regional studies, a corpus retrieval and application platform, as well as infrastructure such as language intelligence laboratory and digital humanities laboratory. They promote high-end talents in the development and application of language data by promoting industry-university-research cooperation in corpus construction and application [8].

There are multiple models for forming a mentor team, which can be the joint training of different professional mentors within the same school, the joint training of mentors from different schools, or the joint training of school-enterprise cooperation. The interdisciplinary graduate education program of the Massachusetts Institute of Technology adopts the joint training model of mentors and committees. The mentors come from different departments and develop training plans and research directions according to the interests of graduate students [9]. The mentor team must have a clear goal, which is to cultivate high-level innovative talents. By optimizing the combination of mentor resources, the mentors of the entire team are closely linked. Therefore, the team should clarify the training goals of graduate students, respect the commonality and uniqueness of each teacher and graduate student, and form a complete set of interdisciplinary graduate training models.

The mentor team was established for a common goal, which is to cultivate high-quality graduate students. However, if there is no scientific and effective evaluation system, there will be various interest competitions among members, which will reduce the cohesion of the team [10]. To this end, a corresponding team management mechanism must be formed, and a scientific and complete evaluation index system for the mentor team must be established.

5. Conclusions

Cross-integration is an important reform direction of the new liberal arts. Humanistic-oriented artificial intelligence research and talent training means that the field of artificial intelligence research needs to integrate comprehensive research fields of liberal arts such as psychology, sociology, and ethics. Social issues are naturally a problem of fusion of disciplines. To cultivate humanities talents for the future, cross-integration is particularly critical. The cross integration of

humanities and society, liberal arts and sciences, and liberal arts and technical sciences will give birth to a series of new industries to meet the needs of new talents.

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References

- [1]Zhang Jiang, Leading the Construction of New Liberal Arts with Scientific Spirit, Journal of Shanghai Jiaotong University (Philosophy and Social Sciences), 2020, 28(1):7-10.
- [2] Zhang Junzong. The Explaining of the New Liberal Arts from the Four Dimensions [J]. Journal of Northwest Normal University (Social Sciences), 2019, 267(05):15-19.
- [3] Institute of Artificial Intelligence, Tsinghua University. Report of AI-powered Academic Search[R],2020.2.
- [4] Xiong Minghui. From Jurimetrics to Legal Informatics: The 70 Years' History of AI & Law (1949-2019)[J]. Journal of Dialectics of Nature, 2020, 42(6):1-9.
- [5] He Xiao-bin, SHI Yi-qi. The Development of Artificial Intelligence and the Training of AI Talents in Humanities and Social Sciences in China [J]. Tsinghua Journal of Education,2019, (4):32-38.
- [6] Liu ZhiShen, Guojiang, Liu Duanyang. Exploration on the mode of training innovation and practice ability of graduate students in research team [J]. Computer Era, 2021, (1):76-79.
- [7] YANG Chun-Lin, WANG Shujuan, Lv Chao. Construction of Research Oriented Electronic Technology Teaching Team and Strengthening Cultivation for Interdisciplinary Talent Training [J].Journal of Electrical & Electronic Education, 2020, 42(6):16-20.
- [8] Zhu Yongdong, Zhang Zhengang, Ye Yujia. Characteristics and Enlightenment of MIT's Cross-Disciplinary Postgraduate Training[J]. Research in Higher Education of Engineering, 2015, (2): 134-138.
- [9] Wang Zhaojun, Ren Xing-wang. The experience of foreign interdisciplinary graduate student education and its enlightenment to the interdisciplinary postgraduate cultivation in China [J].Journal of Qingdao University of Science and Technology (Social Sciences), 2018, 34(2):109-116.
- [10] Tang Li,Zhu Neng, Xiao Nengqun. Discussion on the application of the regular meeting system based on the interdisciplinary tutor team in the training of pharmacy graduate students[J].Education Teaching Forum,2016,(32):275-276.