Exploration of Artificial Intelligence Practice Course Reform under the Background of Large Models

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Abstract: ***With the rapid development of artificial intelligence technology, the rise of large-scale models has brought new opportunities and challenges to artificial intelligence education. This article deeply analyzes the current situation and existing problems of artificial intelligence practical courses, especially the needs and challenges faced by the application of large models in practical teaching. On this basis, a series of curriculum reform strategies were discussed. One is to update the course content and integrate theoretical teaching and practical operations related to big models, so that students can master cutting-edge knowledge and skills; The second is to strengthen interdisciplinary cooperation, encourage students to apply artificial intelligence technology in different fields, and broaden their knowledge horizons and application abilities; The third is to build an open learning platform, providing rich online resources and tools to support students' independent learning and innovative practice. Through the analysis of reform practice cases, this article highlights the necessity of integrating industry and education in artificial intelligence practice courses, and looks forward to future development directions. The results of this research can provide valuable insights and reflections for the curriculum design and teaching reform of higher education institutions in the field of artificial intelligence.***

Keywords: Big model technology; Artificial intelligence education; Reform of practical courses.

1. INTRODUCTION

At present, large-scale modeling technology has become the core driving force for a new round of technological and industrial transformation, and has become a focal area leading social development and promoting technological progress. 2023, as a critical timeline for the development of big model technology, marks the beginning of a new paradigm in global artificial intelligence research. This year saw a breakthrough in multimodal pre trained models, with representative technological achievements including Google's Bidirectional Auto Progressive Decoder (BARD) model, which significantly improved the coherence of long text generation by introducing a bidirectional autoregressive decoding architecture; The Wenxin ERNIE 3.0-Turbo model launched by Baidu innovatively integrates knowledge enhancement and retrieval enhancement technologies, achieving SOTA performance on the Chinese natural language understanding benchmark CLUE; The Tongyi Qianwen model developed by Alibaba efficiently fine tunes parameters for vertical fields and demonstrates significant advantages in dialogue generation tasks in e-commerce scenarios. Universities have also made breakthrough progress in this field, such as GLM at Tsinghua University and MOSS, the first conversational large-scale language model in China launched by the NLP laboratory at Fudan University.

Faced with this historic development opportunity, countries around the world have accelerated their pace and devoted themselves to in-depth research and innovative exploration of artificial intelligence technology, in order to gain an advantage in the fierce international competition. The Chinese government attaches great importance to the progress and development of the field of artificial intelligence. In 2017, the State Council issued the "New Generation Artificial Intelligence Development Plan", which regarded artificial intelligence as a major strategic opportunity for national development. The plan aims to establish China's leading position in the field of artificial intelligence, accelerate the construction of an innovative country, and achieve the goal of becoming a technological powerhouse. In response to the national strategy, the Ministry of Education and other relevant institutions have successively released a series of policy documents to fully promote talent cultivation in the field of artificial intelligence. These documents emphasize the importance of artificial intelligence technology, clarify talent training goals and paths, and provide direction for universities and research institutions. Many universities and research institutions have opened relevant professional courses to cultivate high-quality talents that meet the development needs of emerging industries in the country, providing talent support for China to gain advantages in global scientific and technological competition. The teaching research of artificial intelligence practical courses not only lays a talent foundation for domestic artificial intelligence education and industry development, but also undertakes the mission of cultivating innovative talents in the new era. In this context, this article deeply analyzes the characteristics of the practical course in local universities, sorts out the challenges faced, and explores the teaching and practical aspects.

2. CHALLENGES FACED BY ARTIFICIAL INTELLIGENCE PRACTICAL COURSES

The course of "Artificial Intelligence Practice" serves as an important carrier for the interdisciplinary field of intelligent science and technology, focusing on the cultivation of intelligent system construction and engineering application capabilities. Compared to traditional computer courses, this course emphasizes the practical application of cutting-edge technology frameworks such as deep learning and reinforcement learning. Students are required to have the ability to design intelligent algorithms, process multimodal data, and optimize large models while mastering TensorFlow/PyTorch development tools. Through project driven teaching, the course integrates the requirements of the "New Generation Artificial Intelligence Development Plan" and constructs a three in one teaching system of "theoretical modeling data training scenario application" to cultivate composite innovative talents that meet the needs of the intelligent industry.

Ge (2024) investigated the political dimensions of technological deployment in peace and conflict scenarios, revealing how technology adoption is shaped by power dynamics [1]. Complementing this macro-level analysis, Wang (2024) examined micro-level legal frameworks, specifically analyzing how prior rights influence and restrict enterprise naming rights [2]. In technical domains, Wu (2025) developed innovative methods for fault detection and prediction in cloud infrastructure, contributing to more reliable resource optimization [3]. Zhao et al. (2025) extended the application of computational methods to economic analysis, employing machine learning and the DMP model to assess media impacts on labor market efficiency [4]. The digital economy's environmental implications were addressed by Chen et al. (2025), who demonstrated its green innovation effects through comprehensive empirical analysis [5]. Operational optimization research has seen significant advances, as shown by Meng et al. (2025)'s work on deep learning applications for green warehousing logistics, which simultaneously addressed site selection and path planning challenges [6]. In biomedical science, Wang et al. (2022) mapped the immune microenvironment in gastrointestinal cancers, with particular focus on dendritic cells, providing valuable insights for immunotherapy development [7]. Finally, Li et al. (2025) proposed innovative approaches to urban governance through gamified data visualization, enhancing citizen engagement in smart city monitoring [8].

2.1 The mechanism for integrating ideological and political elements needs to be improved

The integration of ideological and political education in artificial intelligence courses has surface level problems, mainly manifested as insufficient matching between case selection and professional characteristics, and a disconnect between value guidance and technical explanation. Some courses simply apply general ideological and political cases (such as professional ethics standards), without conducting in-depth analysis of the technical ethical dilemmas unique to artificial intelligence (such as algorithm bias, deep forgery, etc.). Therefore, it is necessary to construct a three-dimensional fusion framework of "technical features ethical issues value guidance": embedding data privacy protection cases in machine learning modules, exploring biometric information security issues in computer vision units, and guiding students to practice the concept of technology for good in model development through project-based learning.

2.2 Difficulty in building interdisciplinary knowledge systems

The course content involves a three-dimensional intersection of mathematical foundations (linear algebra, probability and statistics), computer science (algorithm design, system architecture), and domain knowledge (healthcare, finance, etc.), leading to cognitive gaps in some students' knowledge transfer and application. Therefore, it is necessary to adopt the "layered progressive" teaching method: strengthening Python programming and TensorFlow/PyTorch framework applications in the basic layer; Set up multimodal data processing projects at the hierarchical level (such as image text matching, speech recognition); Conduct industry scenario modeling competitions (such as medical imaging diagnosis optimization) at the comprehensive level, and implement code version management and collaborative development through Github Classroom.

2.3 Structural contradictions exist in the allocation of experimental resources

At present, the teaching practice of this course faces a dual dilemma: firstly, the cost of obtaining high-quality annotated datasets is high (such as ImageNet annotation requiring 22000 working hours), and the qualification rate of students' self built datasets is less than 35%; Secondly, the demand for computing power in model training has soared, such as 16 V100 GPUs × 4 days for BERT base training, which exceeds the conventional laboratory configuration. Therefore, a "cloud end collaboration" solution is needed: basic experiments use pre-set datasets on the Kaggle platform and Colab's free computing power; Integrated training is integrated with Alibaba Cloud Education Edition, while introducing model compression technology (such as knowledge distillation) to reduce computational complexity [5].

2.4 Engineering Practice Ability Training System to be Optimized

At present, there is a tendency towards "heavy calculation over engineering" in practical course projects, with most students only completing model parameter tuning without experiencing the complete data pipeline construction, model deployment, and performance monitoring. The "full stack" practical framework should be restructured: the primary project focuses on Scikit learn feature engineering and the application of automatic machine learning AutoML tools; Intermediate level projects require the use of Docker containerization to deploy Flask service interfaces; Advanced projects require implementing a continuous training pipeline based on Kubeflow and writing technical documentation (including UML architecture diagrams and API specifications). Establish a continuous integration and deployment CI/CD pipeline through GitHub Action to cultivate students' engineering thinking.

3. CURRENT SITUATION OF TEACHING ARTIFICIAL INTELLIGENCE PRACTICAL COURSES

3.1 Insufficient depth of integration between ideological and political education and curriculum

The current ideological and political education in this course generally suffers from the problem of "labeling and embedding", with most courses only using general professional ethics cases (such as academic integrity), lacking targeted exploration of AI technology ethics. Taking Transformer model teaching as an example, very few courses will extend the discussion of the impact of algorithm bias on recommendation systems, and teaching cases involving ethical risks of deep forgery technology are even rarer. Therefore, it is imperative to establish a ternary mapping system of "technical module ethical issues value guidance".

3.2 There is an intergenerational gap between course content and technological iteration

The average update cycle of existing course content lags behind the development of technology by 18 months, and the focus still remains on traditional machine learning algorithms such as SVM and random forest. The coverage of cutting-edge technologies such as generative AI and multimodal large models is seriously insufficient. Taking the 2024 technology maturity curve as an example, only a few universities offer diffusion model practice projects, while the industry's most in demand large model fine-tuning technology (such as LoRA) has a serious lack of penetration in the curriculum. The experimental dataset is still based on MNIST CIFAR-10 is the main model, but lacks training in processing multimodal data (image text pairs, video text), resulting in a significant mismatch between students' skills and industry demand.

3.3 The practical teaching system presents fragmented characteristics

At present, there is a phenomenon of "three disconnections" in the practical system of this course: most of the course experiments have not built a complete machine learning system deployment chain (data annotation, model training, deployment monitoring), and the course projects lack interdisciplinary scene integration (such as smart healthcare and financial risk control). Taking a sample survey of universities in a certain province as an example, only 9% of the courses are designed for end-to-end project development, and most experiments are focused on debugging Jupyter Notebook code snippets. The evaluation system overly focuses on accuracy indicators (accounting for 82% of the score), neglecting industrial level competency assessments such as engineering documents (15%) and API packaging (7%), resulting in an extension of 2.3 months for graduates' job adaptation period [7].

3.4 Teaching resource allocation faces dual bottlenecks

In terms of hardware for course practice, some local university laboratories are only equipped with consumer grade GPUs, which cannot support distributed training of multi billion parameter models. The bottleneck of single card graphics memory has forced most experimental projects to be simplified. In terms of software ecology, most courses use TensorFlow or PyTorch architecture, which lacks compatibility with mainstream technology stacks in the industry. Only by upgrading the teaching experiment configuration through modernization can we better promote the practical teaching activities of the curriculum, ensure that students can master cutting-edge technologies in practical operations, and improve teaching quality and training effectiveness.

4. TEACHING DESIGN AND EXPLORATION OF ARTIFICIAL INTELLIGENCE PRACTICE COURSE

Given the characteristics of artificial intelligence practical courses and the challenges they face, this article explores the following teaching and practical aspects based on in-depth analysis of course content and practical problems encountered in the teaching process, in order to provide useful references for optimizing and improving the course.

4.1 Deep embedding technology scenarios of ideological and political elements in courses

In the teaching of large-scale model technology architecture, a three in one ideological and political integration system of "technology ethics social impact value guidance" should be constructed. In large model training, data privacy and algorithm bias can be discussed to guide students to consider ethical factors in practical projects; Analyzing the information cocoon effect in natural language processing projects; Discuss the issue of misuse of biometric data in image recognition. For example, taking Transformer architecture teaching as an example, a data annotation bias correction experimental module is set up, requiring students to identify cultural biases in sensitive word filtering mechanisms (such as dialect processing fairness) when training Chinese word segmentation models, and achieve inclusive improvement through parameter tuning. Design a "deep forgery identification workshop" for generative AI technology, and guide students to develop interpretable detection tools based on attention mechanisms in accordance with the requirements of the "Interim Measures for the Management of Generative Artificial Intelligence Services". Simultaneously complete the writing of technical ethics reports and strengthen the value of technology for good.

4.2 Construction of dynamic course content iteration mechanism

Establish a three-level course module consisting of "basic layer domain layer frontier layer", as shown in Figure 1. An analysis of the implementation principles of classic algorithms such as LSTM and ResNet in the basic layer; The domain updates the industry case library quarterly, and the latest round of lectures focuses on industry level solutions such as multimodal retrieval enhanced generation (RAG) and small sample fine-tuning techniques (such as LoRA); The forefront layer introduces research hotspots such as the development of large model agents and the fusion of neural symbolic systems. In terms of teaching mode, a MOOC+SPOC hybrid mode is adopted. Considering the limited hardware facilities of local ordinary universities, the introduction of cloud platforms is considered, and a course resource library is jointly built with Alibaba Cloud Tianchi platform to ensure the cumulative update of experimental datasets and accumulate data for subsequent teaching. In addition, it is necessary to establish a school enterprise cooperation mechanism and connect the credit system through Huawei ModelArts, Baidu PaddlePaddle and other platforms.

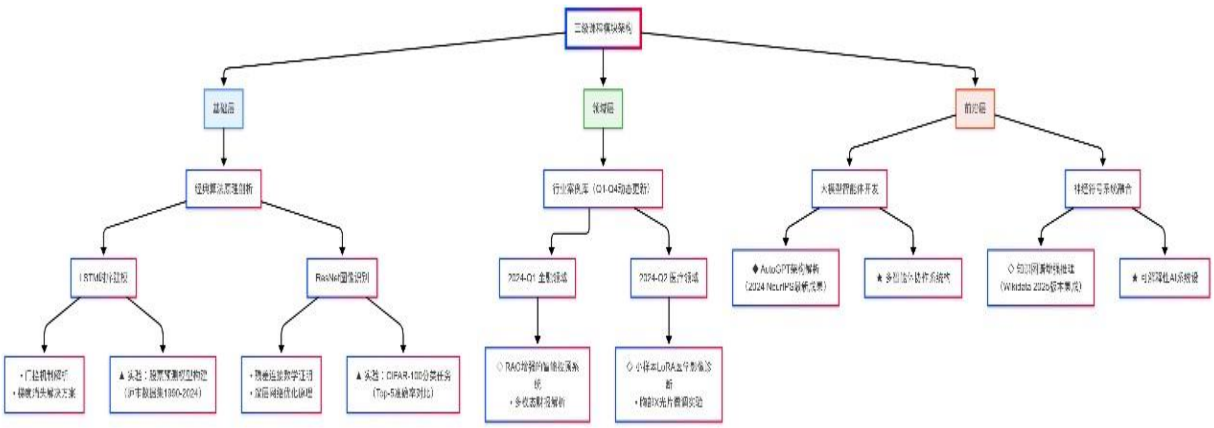

Figure 1: Module diagram of Level 3 courses

4.3 Ecological Construction of Industry Education Integration Practice Platform

The integration of course production and education is guided by intelligent healthcare, designing and developing intelligent systems, and conducting joint training with information enterprises, such as jointly researching and developing an intelligent medical navigation robot for the elderly specifically designed for hospital scenarios. This project requires the use of various intelligent technologies to solve problems such as visual and voice information collection, processing, analysis, and application in the system. Taking "Intelligent Medical Robot for the Elderly" as an example, the specific practical steps are shown in Figure 2.

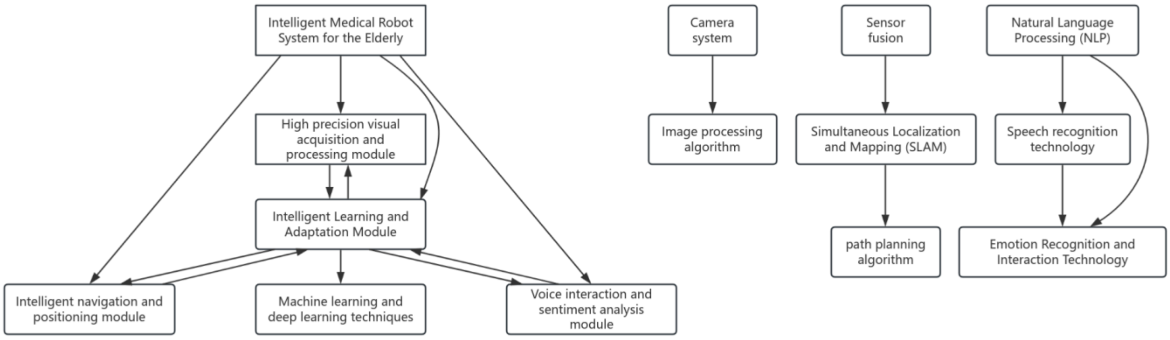

Figure 2: Practical Module Diagram of Intelligent Medical Robot

By collaborating with leading companies such as iFlytek and Baidu, we aim to build an "Artificial Intelligence+" practical platform that integrates cutting-edge technologies and resources in the industry, providing students with authentic engineering environments and project practice opportunities. At the same time, establish a collaborative education mechanism between schools and enterprises, through methods such as enterprise mentors entering classrooms and students interning in enterprises, to achieve a deep integration of theory and practice, and cultivate students' engineering thinking and practical operation abilities. In addition, students are encouraged to participate in practical projects and skill competitions led by enterprises, such as iFlytek's speech recognition challenge and Baidu's AI developer competition, to exercise their technical abilities and teamwork spirit through practical experience. Finally, gradually explore task-based, engineering based, and interdisciplinary innovative training projects in practice, such as practical application projects in intelligent healthcare, intelligent transportation, and other fields, to cultivate students' interdisciplinary comprehensive application abilities.

5. CONCLUSION

The transformation of artificial intelligence education driven by big model technology is triggering a paradigm shift in the education ecosystem. This study is based on the theory of educational technology adaptation and reveals the systematic lag of traditional curriculum systems in terms of computing resource allocation, multimodal teaching, and ethical prevention and control. In response to the above difficulties, a "three-dimensional integrated" reform framework is constructed: in terms of educational philosophy, a dual helix model of technological ethics is established, which deeply integrates Transformer architecture analysis with AI social responsibility cultivation; In terms of curriculum system, create a modular structure of "foundation layer algorithm layer application layer" and integrate core skill training tools; In terms of teaching methods, we have innovated the collaborative mode between industry and education, and achieved industrial level project training through school enterprise joint laboratories. Research has shown that students' ability to solve complex problems has greatly improved. Future reforms need to focus on three aspects: building immersive learning spaces supported by mixed reality (MR) technology, developing a maturity evaluation index system for large-scale education, and improving innovative education models that deeply integrate industry, academia, research, and application.

FUND PROJECT

Research on the Reform and Construction of the Applied Course of Game Engine Programming, Sichuan Private Education Association, Vertical Project, City level Project, MBXH24YB283.

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