

Exploration and Practice of Industry-University Integrated Training Model for Entity-Oriented Artificial Intelligence Professional Postgraduates

Ye Wang, Zongyu Zhang, Naiyao Wang

College of Artificial Intelligence, Dalian Maritime University, Dalian 116026, Liaoning, China

Copyright: © 2026 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: To further deepen the educational reform of professional master programs in Artificial Intelligence at Dalian Maritime University and optimize its first-class talent cultivation system with distinctive maritime features, this study explores and refines the postgraduate cultivation mechanism tailored to the interdisciplinary training demands of the university's AI professional degree programs. An industry-university-research integrated cultivation model is proposed, aiming to support the quality improvement of professional postgraduate education and provide a referential paradigm for cultivating high-level innovative and application-oriented talents.

Keywords: Artificial intelligence discipline; Industry-university-research integration; Professional degree postgraduates; Teaching model

Online publication: August 13, 2026

1. Introduction

Artificial Intelligence is a strategic technology leading the new wave of technological revolution, industrial transformation and social change, and it is exerting profound and far-reaching impacts on economic development, social progress and the international political and economic landscape^[1]. In September 2020, the Development Plan for Professional Postgraduate Education (2020–2025), jointly issued by the Academic Degrees Committee of the State Council and the Ministry of Education, emphasized the development of professional degree education and the improvement of practical innovation capabilities and training quality through industry-education integration^[2,3]. The Action Plan for “Artificial Intelligence plus Education” (No. 2026-01 of the Ministry of Education), issued in 2026, points out that professional postgraduates should be targeted at industrial intelligent upgrading and emerging industries and positions. It aims to cultivate high-level applied, interdisciplinary and practical talents specialized in artificial intelligence combined with industrial applications. Different from academic research focusing on basic theories, this training highlights the ability to

solve practical and complex engineering and industrial problems ^[4].

The discipline of artificial intelligence is characterized by interdisciplinary integration, strong penetration and wide supporting capabilities. In the training process, it is required to comply with the strategic goal of promoting the in-depth integration of artificial intelligence and the real economy. Combining institutional advantages of universities, reform should be taken as the driving force to break disciplinary barriers, promote the integration and sharing of educational and teaching resources, and encourage innovation in interdisciplinary development, cross-domain integration, practical training and personalized education ^[5–7]. The industry-university-research integrated training model for professional postgraduates oriented to entity artificial intelligence has become one of the mainstream training approaches in this field ^[8–11]. Through industry-university-research collaboration, this model enables students to learn and practice in real industrial scenarios, fostering high-level talents with innovative thinking and practical experience, and injecting sustainable momentum into the development of the entity artificial intelligence industry ^[11–13].

Taking the School of Artificial Intelligence of Dalian Maritime University as an example, this paper comprehensively introduces the industry-university-research integrated training mechanism for interdisciplinary artificial intelligence professional postgraduates oriented to industrial demands. It summarizes a series of innovative measures implemented under this mechanism.

2. Challenges in the training of artificial intelligence professional degree postgraduates

The training of professional degree postgraduates aims to meet industrial development demands and cultivate high-level applied and interdisciplinary professionals with innovative spirit, practical capabilities and professional competence. Although China has achieved remarkable progress in professional postgraduate education, new challenges still exist in the implementation of industry-university-research collaborative training:

- (1) How to establish a comprehensive industry-university-research integrated postgraduate training mechanism for entity artificial intelligence, improve the training quality of talents in this field, and effectively integrate ideological and political education elements?

With the continuous development of artificial intelligence theory, the demand for applied AI talents is rising globally. Artificial intelligence is a highly interdisciplinary discipline covering multiple fields, and traditional theory-oriented training can no longer meet industrial requirements, requiring a transformation toward entity artificial intelligence ^[8,11]. At present, a mature training mechanism for entity artificial intelligence professional postgraduates has not yet been established in China, and effective approaches for integrating ideological and political elements still need further exploration.

- (2) How to realize timely, flexible and diversified teaching to keep pace with the technological and theoretical updates in the field of entity artificial intelligence?

The industry-university-research integrated training mechanism for AI professional postgraduates requires the integration and collaborative development of industry, teaching and scientific research, enabling flexible interdisciplinary interaction to meet individualized training needs and form innovative training schemes. Realizing adaptive and diversified teaching that keeps up with the rapid development of entity artificial intelligence technology and theories has become a new requirement for professional postgraduate training ^[3,14].

- (3) How to enhance postgraduates' academic and practical capabilities through the new "triple integration of

industry, education and research” training mechanism to meet the educational demands of entity artificial intelligence technology?

Currently, feedback in postgraduate training is insufficiently timely and intuitive. The training process relies heavily on supervisors, with limited practical opportunities and insufficient theoretical verification. It is urgent to transform theoretical knowledge and engineering principles from academic research into practical training content to improve students’ comprehensive and practical abilities^[12,15]. Therefore, establishing a new training mechanism based on industry-education-research integration to enhance postgraduates’ academic competence and global perspectives is an essential requirement for the development of next-generation artificial intelligence.

3. Research on industry-university-research integrated training model

The exploration and practice of entity artificial intelligence training constitute an important part of postgraduate education in the next-generation artificial intelligence discipline. The objectives of developing the industry-university-research integrated training model are as follows:

- (1) Explore the professional knowledge system of artificial intelligence, construct a targeted training system for entity artificial intelligence professional postgraduates, and implement the “triple integration” of professional education through industry-education-research cooperation, so as to ensure the advancement, completeness and practicality of postgraduates’ AI knowledge framework.
- (2) Explore application-oriented scientific and technological innovation methods. Taking artificial intelligence industrial application as the core, organize interdisciplinary and university-enterprise cooperative research teams with practical artificial intelligence backgrounds. Fully exploit the interdisciplinary and practical characteristics of the training mechanism to promote application-oriented technological innovation.
- (3) Exploring the transformation mechanism of engineering application achievements, the training of professional postgraduate students focuses on industrial application value. Starting from industrial demands, it forms a closed loop of industrial demand, scientific research and achievement transformation, and cultivates artificial intelligence talents with positive values and practical industrial perspectives.

Based on the research objectives of the industry-university-research integrated training model, an integrated training framework is established (as shown in **Figure 1**). In accordance with national policies and the development orientation, disciplinary layout and faculty structure of the artificial intelligence field, this study constructs a training mechanism that integrates theoretical talents and “Artificial Intelligence + X” interdisciplinary talents, and explores innovative approaches for interdisciplinary development and talent cultivation. Adopting a student-centered approach and focusing on teaching, research, and industry, the framework targets the development of an academic knowledge mechanism, application-oriented technological innovation, and engineering achievement transformation. It establishes an integrated industry-university-research training mechanism for artificial intelligence professional postgraduates, covering five core dimensions: teaching and research, industry and education, thinking and systems, theory and engineering, and vision and ideological education.

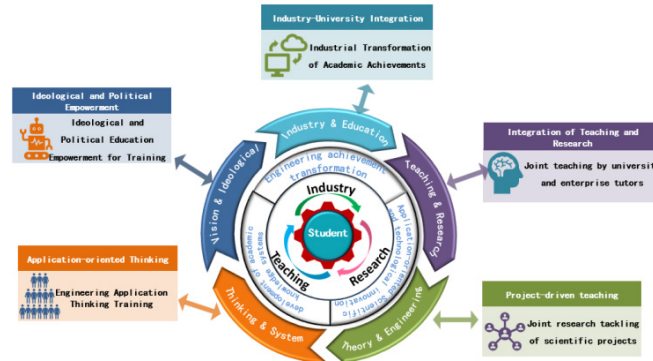


Figure 1. Industry-university-research integrated training model.

Teaching module: University and enterprise supervisors jointly deliver three core courses, namely Applied Experiments of Autonomous Intelligent Mechanisms, Machine Learning Application Experiments, and Frontiers and Practical Application of Disciplines. The curriculum is systematically optimized to meet the development needs of entity artificial intelligence.

Research module: It consists of joint research cooperation, engineering transformation of scientific theories, and academic publication. Scientific research is closely combined with practical engineering requirements to cultivate students' practical engineering capabilities.

Industry module: Enterprise supervisors participate in the whole training process, including academic research and achievement transformation. They are involved in thesis topic selection, research design and dissertation preparation, which helps cultivate students' industrial thinking and enhance their ability to solve practical problems in the field of entity artificial intelligence.

- (1) Industry-University-Research Integration to Maintain the Advancement of Training System. To ensure the advanced development of entity artificial intelligence training for professional postgraduates, the industry-education-research integration model is implemented. Universities and enterprises collaborate closely, and enterprise supervisors participate in joint training throughout the whole process. They provide professional guidance on emerging industrial trends and practical demands of entity artificial intelligence, and guide students to track, reproduce and innovate research frontiers. Meanwhile, outdated knowledge is continuously updated to ensure the rationality and advancement of the training mechanism.
- (2) The training of new artificial intelligence professional degree students takes into account the practical needs of the realization of artificial intelligence. The integrated research, production and education training mechanism for professional degree students in the field of practical artificial intelligence should fully focus on the new business needs of the actual realization of artificial intelligence in the industry. At the same time, it needs to take into account the multi-disciplinary training mechanism, organize a faculty team with interdisciplinary cross-school cooperation, refer to, analyze and absorb the new forms of training for professional degree students in various disciplines, in order to enrich the comprehensiveness of the training of practical artificial intelligence for graduate students.
- (3) University-Enterprise Collaboration to Enhance the Practicality of the Training Mechanism. The industry-university-research integrated training model for entity artificial intelligence is an innovative and future-oriented training approach closely linked to industrial development and employment. The mechanism keeps pace with advanced training concepts, focuses on cutting-edge developments in entity artificial intelligence, and optimizes practical training modules. It combines theoretical knowledge with industrial

practice, and cultivates specialized talents required for the development of entity artificial intelligence.

The proposed training mechanism ensures high practical value. On the one hand, it fully considers students' needs and optimizes the scope and difficulty of teaching, research and practical training, enabling students to grasp the latest development trends of entity artificial intelligence. On the other hand, university and enterprise supervisors jointly promote collaborative teaching and guidance, connect professional knowledge with industrial practical demands, and improve the overall teaching effectiveness.

4. Conclusion

Based on the current situation analysis of the training of professionals in the field of artificial intelligence, summarizing the main problems existing in the current training model and the new demands for the training of professional degree students brought about by the development of the artificial intelligence industry, and in response to these problems and demands, a training model integrating industry, academia and research has been proposed. Through the training path of integrating industry, academia and research, more outstanding talents with comprehensive knowledge, skills and qualities in artificial intelligence will be cultivated, thereby making greater contributions to the development of the industry and the progress of society. At the same time, this also provides new ideas for the training of professional degree students in the field of artificial intelligence.

Funding

Research Project of Postgraduate Education and Teaching Reform of Liaoning Province (Liaoning Education Notice [2023] No. 385-153), Teaching Reform Project of Dalian Maritime University (Project No.: BJG-C2026087)

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Ministry of Education, National Development and Reform Commission, Ministry of Finance, 2020, Notice on Issuing Several Opinions on Promoting Discipline Integration and Accelerating Postgraduate Training in Artificial Intelligence for Double First-Class Universities.
- [2] Sun LL, Guo G, Duan HJ, 2025, Construction and Practice of the "Five-Dimensions and Three-Aspects Integrated" Training Model for Professional Postgraduates in Control Science and Engineering. *Journal of Higher Education*, 11(22): 163–166.
- [3] Academic Degrees Committee of the State Council, Ministry of Education, 2020, Notice on Issuing the Development Plan for Professional Postgraduate Education (2020–2025).
- [4] Ministry of Education, National Development and Reform Commission, Ministry of Industry and Information Technology, Ministry of Science and Technology, National Data Administration, 2026, Notice on Issuing the Artificial Intelligence Plus Action Plan for Education.

- [5] Zhai MD, Hu HL, Yi PL, et al., 2025, Exploration on the Industry-University-Research Joint Training Model for Professional Postgraduates. *China Modern Educational Equipment*, 15: 118–120 + 124.
- [6] Deng W, Zhao HM, Xu JJ, et al., 2024, Case-Project Driven Teaching Method for Artificial Intelligence Postgraduate Training. *Journal of Higher Education*, 10(28): 50–53 + 58.
- [7] Liang C, Li B, Peng M, et al., 2022, Revision of Training Scheme for Artificial Intelligence Postgraduates: Problems, Causes and Countermeasures. *Computer Education*: 17–20 + 25.
- [8] Zhao D, Qin XY, 2025, Research on the “Double-Driving and Four-Practice” Talent Training Model for Engineering Professional Postgraduates. *Industry and Information Technology Education*, 9: 1–6.
- [9] Dai W, Xu M, Liu X, et al., 2025, Exploration and Practice of Interdisciplinary Professional Postgraduate Training Mechanism for Artificial Intelligence—A Case Study of China University of Mining and Technology. *Control Engineering*, 32(1): 185–192.
- [10] Wen GH, Jiang WZ, Chen HL, 2010, Strengthening Professional Practice to Ensure the Training Quality of Full-time Professional Postgraduates. *Degrees and Postgraduate Education*, 8: 1–4.
- [11] Li M, Gao F, Ou L, et al., 2025, Research on Teaching Model Reform of Chinese Materia Medica Professional Postgraduates Based on University-Enterprise-Institute Cooperation. *China Higher Education Bulletin*, 11(29): 153–166.
- [12] Yang ZH, Zhu C, Huang CW, et al., 2025, Exploration on Practical Teaching Mode of Internet of Things Professional Postgraduates Based on Industry-Education Integration. *Journal of Higher Education*, 11(28): 1–4.
- [13] Zhang M, Zhou WT, Li L, 2024, Research on Training Concept and Practice of Engineering Competence for Professional Postgraduates—Taking Artificial Intelligence Major of Electronic Information in Beijing University of Posts and Telecommunications as an Example. *Industry and Information Technology Education*: 70–76.
- [14] Hu ZT, Jin Y, Zhou L, et al., 2025, Research on Artificial Intelligence Professional Postgraduate Training Model Under Deep Integration of Industry, University, Research and Practice. *China Modern Equipment Education*: 132–134.
- [15] Zhou JL, Xia F, 2025, Core Selection Criteria for External Supervisors of Professional Postgraduates: From the Perspective of Competency Classification Theory. *Heilongjiang Higher Education Research*, 43(10): 56–64.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.