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Research on the Reform and Practice of the "Artificial Intelligence Literacy" Course in Industrial Robotics Major

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Abstract:

This paper focuses on the reform and practical research of the "Artificial Intelligence Literacy" course for the industrial robotics major. Against the backdrop of intelligent manufacturing, the integration of industrial robotics and artificial intelligence (AI) is urgently needed. However, traditional courses suffer from issues such as disjointed content and monotonous teaching methods. The reform revolves around three objectives: knowledge and skill acquisition, competency development, and literacy enhancement. It involves optimizing teaching content (constructing a framework of "basic theory + professional application + cutting-edge expansion"), innovating teaching methods (adopting project-driven hybrid teaching), and strengthening practical teaching (building a multi-level practical system). The reform is implemented through the development of teaching resources, enhancement of faculty capabilities, and the execution of teaching processes. Practice has shown that the reform improves student learning outcomes, promotes professional development, and generates positive societal impact. Future directions for course optimization are also discussed.

Keywords — **Industrial Robotics; Artificial Intelligence Literacy; Course Reform**

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I. INTRODUCTION

In the rapidly evolving technological landscape, artificial intelligence has become a core driver of transformation across industries. Industrial robotics, as a key component of intelligent manufacturing upgrades, is increasingly intertwined with AI. For students in the industrial robotics major, mastering foundational AI knowledge and application skills is essential to keeping pace with industry trends and enhancing their competitiveness. The "Artificial Intelligence Literacy" course serves as a critical vehicle for cultivating these competencies, and its effectiveness directly impacts students' understanding and application of cutting-edge technologies. However, traditional courses fall short in areas such as content, methods, and practical components, failing to meet students' in-depth needs for AI knowledge or the industry's expectations for interdisciplinary talent. Therefore, reforming and practicing the "Artificial Intelligence Literacy" course for the industrial robotics major holds significant practical importance.

II. BACKGROUND OF COURSE REFORM

A. *Industry Development Needs*

With the advancement of intelligent manufacturing, industrial robots are being increasingly deployed in production, with their intelligence levels continuously rising. In smart factories, industrial robots rely on AI algorithms for autonomous path planning, intelligent fault diagnosis, and collaborative operations with other equipment. For example, in the welding workshops of automotive manufacturers, industrial robots use deep learning-based visual recognition technology to precisely weld components of different car models, significantly improving production efficiency and product quality. Industry reports indicate that the demand for interdisciplinary talent proficient in both robotics and AI applications will grow rapidly in the coming years. This necessitates that higher education institutions promptly adjust their curricula to strengthen AI-related knowledge and cultivate high-quality talent that meets industry demands.

B. Issues with Existing Courses

Traditional "Artificial Intelligence Literacy" courses often emphasize theoretical knowledge, such as machine learning algorithms and the history of AI, with insufficient integration into the practical scenarios of industrial robotics. Students struggle to understand how these theories apply to industrial robotics, leading to low engagement and weak knowledge retention. Teaching methods are predominantly lecture-based, lacking interactivity and hands-on opportunities. Students passively absorb information with few chances to practice, hindering their ability to translate theory into practical skills. Additionally, assessment methods are overly reliant on final exams, failing to comprehensively evaluate students' learning processes and practical abilities, which dampens motivation and innovative thinking.

III. Objectives of Course Reform

A. Knowledge and Skill Objectives

Through the reform, students will systematically grasp fundamental AI concepts and core technologies, such as machine learning, deep learning, and computer vision, and their applications in industrial robotics. Students will learn to analyze and process operational data from industrial robots for simple fault diagnosis and use AI algorithms to optimize workflows and improve efficiency. For example, students will build quality prediction models using machine learning algorithms based on production line data to preemptively identify potential issues.

B. Competency Development Objectives

Students will develop the ability to apply AI thinking to solve practical problems in industrial robotics. They will propose feasible AI solutions for industrial scenarios and validate them through programming and experimentation. Teamwork, innovation, and self-directed learning skills will be honed through collaborative projects, such as designing an AI-based sorting system for industrial robots.

C. Literacy Enhancement Objectives

Students will gain sensitivity and foresight regarding AI technologies, along with an awareness of ethical considerations. They will understand the societal impacts of AI in industrial robotics and learn to balance technological advancement with ethical responsibility, ensuring sustainable industry practices.

IV. Content of Course Reform

A. Optimizing Teaching Content

The curriculum integrates industrial robotics and AI knowledge into a framework of "basic theory + professional application + cutting-edge expansion." Basic theory covers essential topics like linear regression and neural networks, while professional application includes case studies on visual recognition and fault diagnosis in industrial robotics. Cutting-edge topics explore the latest research, such as embodied intelligence in robotics, to broaden students' horizons.

B. Innovating Teaching Methods

A hybrid approach combines project-driven learning, group collaboration, and online-offline resources. Students work on projects like AI-driven welding quality optimization, supported by online platforms for self-paced learning and offline labs for hands-on practice.

C. Strengthening Practical Teaching

A multi-tiered practical system includes lab experiments, corporate internships, and competitions. Labs are equipped with robotics and AI tools, while partnerships with companies like FANUC provide real-world experience. Competitions like the National Robotics Contest challenge students to apply their skills innovatively.

V. Implementation of Course Reform

A. Teaching Resource Development

New textbooks and case studies align with the reform, featuring real-world examples like AI-assisted assembly in automotive plants. Virtual simulation platforms enable safe and cost-effective experimentation.

B. Faculty Development

Teachers receive AI training and collaborate with industry experts to stay updated on trends. Corporate mentors also contribute to practical instruction.

C. Teaching Process Execution

The course blends engaging introductions (e.g., Tesla's smart factories), interactive classes, and hands-on labs. Assessments are diversified to include projects, lab work, and internships, ensuring holistic evaluation.

VI. Outcomes of Course Reform

A. Improved Student Learning

Students show higher engagement and better performance in projects and internships. For example, AI-based fault diagnosis systems developed by students achieved higher accuracy rates.

B. Professional Advancement

The reform elevated the program's reputation, with higher rankings and stronger industry ties. Partnerships with companies yielded resources like donated equipment and joint curriculum development.

C. Societal Impact

The reform's success attracted peer institutions, leading to shared best practices. Graduates excelled in industry, driving innovation and earning acclaim.

VII. Conclusion and Future Directions

The reform achieved notable success in enhancing learning, professional growth, and societal contributions. Future efforts will deepen industry collaboration, incorporate emerging technologies like VR, and expand global exchanges to cultivate world-class talent.

REFERENCES

[1] Wut M T ,Sum M K C ,Wong M S H .Does perceived risk of AI matter? teachers' AI literacy and institutional support: perspective from self-determination theory[J].Education and Information Technologies,2025,(prepublish):1-23.

[2] Beninger S ,Reppel A ,Stanton J , et al.Facilitating Generative AI Literacy in the Face of Evolving Technology: Interventions in Marketing Classrooms[J].Journal of Marketing Education,2025,47(2):112-125.

[3] Shukla P P .Exploring generative artificial intelligence in teacher education[J].Teaching and Teacher Education,2025,165105088-105088.

[4] Shi J ,Liu W ,Hu K .Exploring How AI Literacy and Self-Regulated Learning Relate to Student Writing Performance and Well-Being in Generative AI-Supported Higher Education[J].Behavioral Sciences,2025,15(5):705-705.

