

Practical Exploration of Integrating Ideological and Political Education into Image Processing Courses

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Abstract: The integration of ideological and political education into specialized curricula represents a critical pathway for fulfilling the fundamental mission of fostering virtue through education in higher institutions. This study investigates the synergistic development of ideological-political education and technical training in engineering disciplines, with a focus on image processing courses in the artificial intelligence era. By reconstructing course content through precise identification of ideological-political elements and adopting a blended online-offline pedagogical framework, we establish an organic connection between digital resources, classroom instruction, and practical training scenarios. This approach enhances the relevance of ideological education while exploring effective methodologies for its implementation. Through multi-year pedagogical innovation, we have achieved enriched educational connotation in technical courses and significant improvements in teaching quality. Key outcomes include student publications in high-impact journals, patented innovations, and enhanced graduate competitiveness in advanced studies and industry roles.

1. Introduction

Fostering virtue through education is the fundamental mission of higher education, with its roots embedded in curriculum design. In October 2019, the Ministry of Education issued the Guidelines on Deepening Undergraduate Education Reform to Improve Talent Development Quality, emphasizing that "ideological and political education in courses should serve as a key mechanism for fulfilling the mission of fostering virtue." This approach reflects the guiding role of Marxism, promotes socialist core values, and ensures the integration of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era into teaching materials, classrooms, and students' minds.

As foundational courses for computer vision, multimedia systems, and intelligent manufacturing, image processing disciplines play a pivotal role in advancing AI-industry integration. While traditional teaching emphasizes technical competencies (e.g., algorithmic design and implementation), ideological-political education focuses on cultivating social responsibility and cultural confidence. The convergence of these dimensions enables students to contextualize technical knowledge within national strategic priorities, particularly in addressing China's demand for AI-empowered industrial transformation.

2. Current Challenges

In the AI era, societal demands extend beyond technical expertise to encompass ideological and political literacy. Professionals in image processing must contribute to national technological advancement and social development, requiring firm ideals, ethical integrity, and a commitment to serving the nation and its people. However, practical barriers in applied universities—such as fragmented teaching objectives, underdeveloped ideological elements, outdated pedagogical models, and simplistic evaluation systems—hinder the synergistic effects of ideological and technical education.

2.1 Curriculum fragmentation between technical training and value cultivation

Image processing courses often prioritize technical content (e.g., algorithms and coding) while neglecting systematic integration of ideological goals. For instance, instructors teaching image recognition algorithms may focus solely on technical principles without incorporating elements like truth-seeking or innovation, resulting in a disconnect between ideological education and professional training.

2.2 Passive learning models dominated by unidirectional knowledge transfer

Traditional lecture-based approaches dominate ideological education, leaving little room for interactive discussions, case studies, or student engagement. Rapid disciplinary advancements further exacerbate time constraints, creating tensions between ideological content delivery and technical skill development.

2.3 Simplistic evaluation systems overemphasizing exam-oriented metrics

Current assessments rely heavily on exam scores, overlooking students' daily ideological engagement or value formation. Such one-dimensional evaluations fail to capture genuine ideological growth or the internalization of socialist core values.

3. Research Framework

This study proposes a "One-Cloud, Two-Wings, Three-Link Interaction" model to synergize knowledge delivery and value cultivation. Leveraging cloud platforms, the framework integrates online resources, classroom teaching, and practical training to achieve ideological-technical synergy.

3.1 Restructuring Course Content with Ideological Elements

Aligning with institutional goals of nurturing applied talent for regional development, the course redesigns content around three pillars: knowledge, skills, and values. Ideological elements are

embedded into syllabi through scientific design, reflecting discipline-specific knowledge and educational principles. Content is modularized and miniaturized to suit student learning patterns.

3.2 Innovating Pedagogy via "Internet +" Strategies

Cloud-based platforms bridge theoretical and practical learning, enabling interactions across online, classroom, and hands-on environments. Case-based and task-driven teaching methods organize fragmented knowledge into thematic modules, allowing seamless integration of ideological elements.

3.3 Multi-Dimensional Evaluation and Sustainable Mechanisms

Beyond academic performance, the evaluation system incorporates social impact metrics (e.g., research publications, patents, competitions) and industry feedback. Sustainable curriculum development is achieved through interdisciplinary integration, research-teaching synergy, and dynamic content updates reflecting technological and societal trends.

4. Implementation Strategies

The ideological and political design roadmap is shown in Figure 1

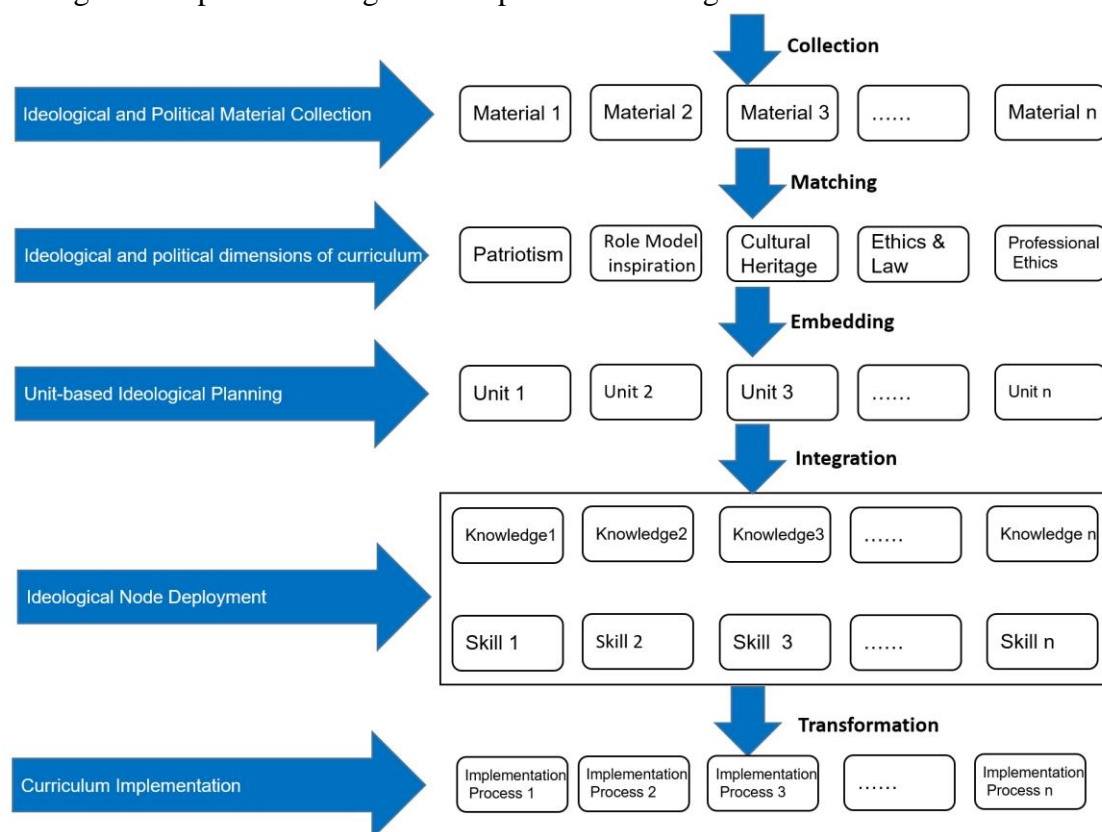


Fig 1. The ideological and political design roadmap

4.1 Ideological-Content Integration

Knowledge objectives cover core theories and engineering applications; skill objectives emphasize problem-solving, algorithmic design, and innovation; value objectives foster

(craftsmanship), scientific rigor, teamwork, cultural confidence, and a sense of national mission.

Examples of Ideological Integration:

(1) Cultural Heritage:

Highlighting Mozi’s pioneering work on optics (circa 400 BCE) and modern AI breakthroughs to underscore "Four Confidences" (in China’s path, theory, system, and culture).

(2) Current Affairs:

Showcasing COVID-19 applications (e.g., AI diagnostics, drone deliveries) as embodiments of Chinese wisdom and corporate patriotism.

(3) Professional Ethics:

Drawing inspiration from historical models like the "Two Bombs, One Satellite" scientists to instill perseverance and innovation.

The ideological and political dimension framework of the curriculum is shown in Table 1.

Table 1. Ideological and Political Education Framework

Dimension	Core Connotation	Sub-themes
Patriotism National Identity	Socialist Core Values Patriotic Spirit	"Four Confidences": Confidence in China's path, theory, system, and culture National pride Sense of historical mission Dedication to national rejuvenation
Role Model inspiration	Scientist Spirit	Craftsmanship Innovation ethos Empirical rigor Perseverance Integrity and selflessness
Cultural Heritage	Chinese Philosophy & Wisdom	Materialism Dialectical thinking Cause-effect analysis Holistic worldview Humanistic values
Ethics & Law	Environmental stewardship	Professional dedication Integrity and fairness Environmental stewardship
Professional Ethics	Ethical Principles	Accountability Transparency Collaborative spirit Ethical decision-making

Next, according to the planning of Ideological and political unit, the deployment of Ideological and political nodes was completed, and the knowledge points were organically integrated. Prepare for the next step of Ideological and political teaching.

4.2 Blended Teaching Model

The "One-Cloud, Two-Wings, and Three-Link Interaction" model combines:

(1) Cloud Platform

Resources co-developed by cross-institutional teams, enriched with regional cultural and

socialist achievements.

(2) Classroom Integration:

Interactive methods (debates, micro-videos, field reports) to engage students and internalize values.

(3) Practical Training:

Project-driven learning via competitions, industry collaborations, and community services to cultivate responsibility and innovation. The case driven teaching practice Integrating Ideological and political elements is shown in Figure2.



Enlightening questions: Does the indentation on the face affect the success rate of face recognition? How will the rejection rate, misjudgement rate and confidence value change?

Image Preprocessing

Raw images often require preliminary processing (grayscale correction, noise filtering) due to acquisition limitations and random interference. Facial image preprocessing specifically involves light compensation, grayscale adjustment, histogram equalization, normalization, geometric correction, filtering, and sharpening operations.

deological and political issues: Are you moved to see these indentations? In order to save protective clothing and improve work efficiency, doctors and nurses in the front line of war and epidemic disease do not go to the toilet for several hours, wear diapers, and the face is deeply impressed by the mask. When they take off the protective clothing, they often get wet all over.

Fig 2. Ideological Node Deployment

4.3 Holistic Evaluation and Sustainability

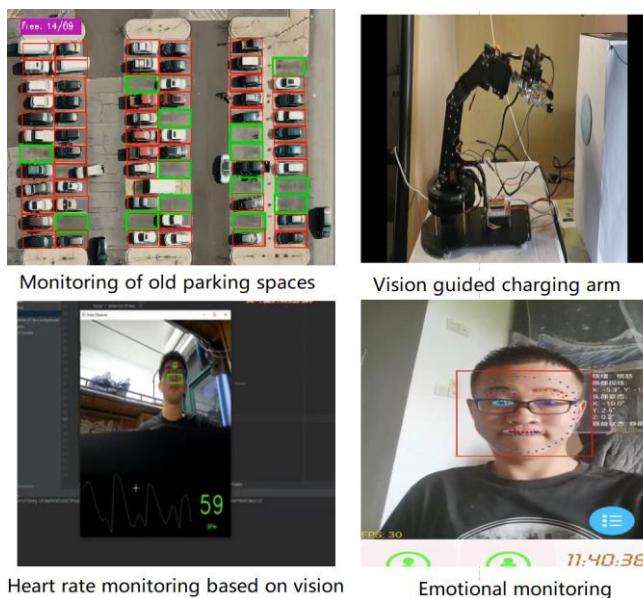


Fig 3. Results of curriculum ideological and political implementation

The effectiveness of curriculum-based ideological education in shaping students' value systems (worldview, life philosophy, ethical orientation) ultimately manifests through observable behavioral outcomes. Results of curriculum ideological and political implementation is shown in Figure3. This study introduces societal impact metrics – including academic publications, research outputs, and

disciplinary competition achievements – to assess learning value. Core objectives focus on cultivating socially responsible competencies by enhancing students' problem-solving acumen and innovative capacities, thereby ensuring academic empowerment and intellectual fulfillment.

5. Conclusion

Through years of pedagogical refinement, our team has achieved value-driven educational enhancements in instructional frameworks, interdisciplinary perspectives, and theoretical rigor. By implementing optimized training models that strengthen knowledge systems and foster teaching-research synergies, we have ignited student motivation through societal relevance alignment, thereby cultivating enhanced sense of purpose and mission in professional development.

The "Triple Access" educational paradigm (early engagement in research projects, academic teams, and laboratory work) facilitates self-directed learning and in-depth inquiry through personalized mentorship. Concurrently, research advancements have driven upgrades in teaching resources, innovation in curricular content, and reforms in inquiry-based pedagogy, cultivating comprehensive entrepreneurial competencies.

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