Cultural Identity in the Age of AI: Dual Dilemmas and Pedagogical Strategies

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Abstract

As embodied AI technologies advance, the logic of cultural identity production has shifted from the conventional binary framework of 'society-individual' to a more complex ternary interactive ecosystem of "human-machine-culture". This study critically examines the double alienation facing cultural identity construction in the age of intelligence: on the one hand, the systematic dissolution of cultural subjectivity by technological power networks; on the other, the adaptive restructuring of educational systems required to safeguard and promote cultural diversity. Using an interdisciplinary perspective that combines critical philosophy of technology with cultural ecology, this research analyses how algorithmic power dominates the mechanisms of cultural meaning production, revealing the resulting alienation of cultural identity. In response to these challenges, this paper proposes three specific educational pathways to address the cultural identity crisis of the intelligent age: First, promoting the ecological transformation of algorithmic literacy education, emphasizing a shift from mere technical tool cognition to a value orientation of power critique and ecological governance; Second, reconstructing a human-machine collaborative space for cultural negotiation, activating the dynamic re-production of cultural meaning through technological mediation and achieving continuous meaning making; Finally, constructing a dynamic governance network involving diverse technological communities, aiming to enhance institutional resilience and embed ethical antibodies that collectively resist the cultural homogenisation risks posed by technological systems. These strategies not only offer new directions for addressing current dilemmas in cultural identity construction, but also propose practical and feasible ways for educational systems to better adapt to the new technological environment.

Keywords Artificial Intelligence Technology; Cultural Identity; Algorithmic Literacy Education

1 Introduction

In an era of increasingly sophisticated technological embodiment, the construction of cultural identity has shifted from traditional socialisation processes to a complex networked practice mediated by technology. This research focuses on the dynamic shaping mechanisms of cultural identity within artificial intelligence technology environments, defining it as a system of meaning attribution that is continuously reconstructed based on human-computer interaction interfaces. This definition breaks through the traditional "society-individual" binary framework of identity research and considers technological infrastructure as the third variable in the production of cultural identity, forming a "techno-cultural ecosystem" interwoven by algorithmic power, data logic and interface politics.

Currently, artificial intelligence systems are reshaping the paradigm of cultural identity formation by decoding cultural meanings through deep learning models, producing cultural symbols through generative content, and framing discourse through recommendation algorithms. This study employs an interdisciplinary methodology that integrates critical philosophy of technology and cultural ecology to deconstruct the procedural subjugation of cultural identity formation by algorithmic power networks. By analysing the dynamic interplay within the human-machine-culture triad, it critiques the erosion of cultural subjectivity through technological determinism, culminating in a proposed adaptive restructuring of the educational system as a technological ecosystem regulator.This research design both extends Raymond Williams' classic proposition of culture as a whole way of life and responds to N. Katherine Hayles' challenge of cognitive embodiment in the posthuman context [1][2], aiming to open up new theoretical growth points at the intersection of technological philosophy and cultural studies.

2 Phenomenological Diagnosis: The Technological Alienation of Cultural Identity Construction

2.1 The Connotation of Cultural Identity and the Shift in Technological Philosophy

Cultural identity, as a system of meaning attribution for individuals and groups within a specific cultural context, is characterised by its dynamism, multidimensionality and constructiveness. From the interdisciplinary perspective of technological philosophy and cultural pedagogy, artificial intelligence has transcended its instrumental attributes to become a meta-medium that shapes cultural cognition. It reconstructs the three dimensions of cultural identity through algorithmic filtering, data-driven representation and interface interaction: First, the symbolic migration of the a priori world. Traditionally, cultural identity is based on the three-dimensional stable structure of "region-language-value", forming a system of meaning attribution with temporal and spatial continuity. The architectural form of the Hakka tulou in agrarian civilisation carries clan ethics, and the rituals of the Naadam Fair in nomadic culture reinforce collective memory, both of which exemplify the deep coupling of cultural identity with physical fields and embodied practices.The advent of the algorithmic society has fundamentally restructured this logic. As models such as ChatGPT or Deepseek process cultural symbols at rates exceeding tens of thousands of tokens per second, and platforms such as TikTok reduce complex cultural practices such as Miao silverwork to ephemeral visual spectacles, the material basis of cultural identity has shifted from embodied existence to a dynamic 'data-interface-feedback' topological system. This technologically mediated mechanism of identity production is, at its core, a networked field of power comprising multiple actors, including algorithms, users and capital. Second, the technological mediation of social relations.Mediation, a key feature of modernity, is highlighted in contemporary society through mediated social interactions and exchanges, focusing on how individuals use mediating tools and mechanisms in their lives. Technological mediation, on the other hand, emphasises the role of technology in this process, exemplified by social media platforms and algorithmic recommendation systems. These technoscapes redefine the ways in which individuals engage in cultural practices through platform architectures and protocol standards. Third, the interface-driven reconstruction of self-representation. Interface technologies, such as virtual avatars, transform identity expression from bodily practices to digital symbol manipulation, deconstructing the continuity and stability of cultural identity through fragmented interactive experiences [3].As the production of cultural identity becomes a matter of parameter optimisation within data models, and the attribution of meaning is reduced to probabilistic calculations within recommendation systems, humanity is transitioning from cultural subjects to feedback components within technological systems.

2.2 Algorithmic Homogenisation: The Systemic Dissolution of Cultural Diversity

Algorithmic homogenisation, a cultural phenomenon unique to the digital age, fundamentally restructures the networks of cultural meaning production through data-driven logic. Using standardised data models and platform-based recommendation systems, this process transforms diverse and dynamic cultural practices into computable, predictable symbolic sets, thereby promoting a global convergence of cultural representations. At its core, algorithmic homogenisation operates on the premise of data adequacy. Technical systems using AI models such as Natural Language Processing (NLP) and Computer Vision (CV) convert linguistic, visual and ritual cultural symbols into quantifiable vector spaces, inevitably leading to the decontextualisation and standardisation of cultural meaning. For example, ChatGPT's text generation mechanism encodes the philosophical concepts of different civilisations, such as "benevolence" in China and "humanity" in the West, into neighbouring vectors in the same semantic network, reducing cultural differences to statistically significant numerical deviations.As a result, cultural differences are reduced to statistically significant numerical deviations. Platforms can directly exclude cultural expressions that do not conform to dominant value frameworks through keyword filtering and censorship, or marginalise non-mainstream cultural content through collaborative filtering algorithms. Through both explicit screening and implicit regulation, users are forced into a technologically predetermined "echo chamber" of mainstream culture. Consequently, the restructuring of cultural identity through algorithmic homogenisation represents a colonisation of the cultural ecosystem by technological rationality. By modelling cultural differences into calculable variable differences, it simultaneously increases the efficiency of information dissemination and undermines the heterogeneity essential for the cultivation of cultural identity. This technological

alienation not only generates a crisis of flattened cultural cognition, but also profoundly threatens the diversity that underpins the survival of human civilisation.

2.3 Hyper-Personalized Fragmentation: The Severance of Collective Memory and the Crisis of Identity

AI-driven hyper-personalisation, while ostensibly catering to individual preferences, paradoxically fractures cultural collectivities through the structural violence inherent in the technological landscape. The core contradiction manifests itself in two primary dimensions: First, the temporal deconstruction of memory. The algorithmic prioritisation of immediate, affectively charged content replaces the deep narratives essential to intergenerational cultural transmission, as the perceived autonomy of users in cultural consumption is in fact a projection of desires algorithmically constructed through behavioural data such as click-through rates and time spent. Douyin's immersive recommendations, for example, use dopamine feedback loops to entice users into an infinite scroll of information, undermining their ability to discern cultural meaning.Second, the spatial fragmentation of communities. Social media platforms that rely on interest-based tagging create echo chambers that foster cognitive isolation among disparate groups. Consider, for example, the starkly contrasting algorithmic content recommendations for "hanfu enthusiasts" and "kimono lovers" in Chinese cyberspace, exacerbating antagonistic cultural identifications. The personalised illusion produced by AI constitutes a novel form of cultural governance, enacted through the dismantling of the spatio-temporal coordinates of collective memory, the erosion of deep cultural meaning, and the fabrication of fluid identity constructs. This process ultimately reconstitutes cultural collectivities as calculable, predictable and controllable data sets. This alienation not only threatens cultural diversity, but also portends a technological future in which all meaning is reduced to data points. Overcoming this predicament requires the reconstruction of an algorithmic humanism framework that embeds cultural ethical antibodies into technological systems [4], thereby transforming artificial intelligence from a cultural deconstructor into a guardian of meaning.

3 Theoretical Deconstruction: The Crisis of Subjectivity within Technological Power Networks

3.1 The Confrontation between Technological Determinism and Critical Theory: How Power is Embedded in the Technological Framework

Technological determinism and critical theory represent two different paradigmatic approaches to understanding technological networks of power. Their conflict and reconciliation illuminate the deep contradictions inherent in the crisis of subjectivity in algorithmic societies. On the one hand, technological determinism posits technology as an autonomous driving force, asserting that instrumental rationality inevitably dominates social progress. Technology, as a product of human practice, continually transforms and simultaneously controls the natural world [5]. Heidegger's concept of enframing characterises technology, arguing that modern technology is not merely a means but a fundamental relational structure: The means is never merely a means, but always also determines man's relationship to things, nature and the world.In contemporary society, while people appear to be the inventors and users of technology, their actions are increasingly dictated by the operational requirements imposed by technology. This implies a shift from technology facilitating the exploration and representation of the world to technology forcing humanity to exist within its pre-defined relational structures. This narrative is concretised in the governance myth of data-driven everything.Conversely, the Frankfurt School's critical theory of technology deconstructed the veneer of technological neutrality and exposed the operating mechanisms of power networks. Marcuse argued that the technological rationality of advanced industrial societies had been alienated into a new form of control that trapped individuals in one-dimensional thinking through the fabrication of false needs [6]. Technological power achieves its skeletal embedding through a dual route: first, the implicit discipline of technological architecture, exemplified by the "collaborative filtering" mechanisms of recommendation algorithms, which are essentially automated cultural selection devices that compress diverse values into calculable user profiles; second, the capital logic of technological practice, where the "data traffic" amplification model of the platform economy forces cultural expression to conform to the value metrics of the attention economy. This collusion between technological rationality and capital power transforms algorithms

from mere tools into a contemporary manifestation of Foucault's productive power, subtly restructuring the subject's cognitive schemata and value coordinates within precisely delivered cultural content.

3.2 Posthumanism and Cultural Ecology's Re-Enlightenment: Potential Pathways Beyond Dualism

Posthumanism deconstructs anthropocentric myths, while cultural ecology reconstructs the techno-life community; both offer ontological and methodological insights for resolving the crisis of subjectivity. On the one hand, posthumanism subverts anthropocentric ontology by reconstructing the relationships between humans and technology, nature and machines. Critical posthumanism, for example, opposes the notion of the human as the centre of the universe and questions the human privilege in morality, ethics and technological development. It also shows how power relations shape subjectivity and provides a decentralised cognitive framework for understanding the cultural identity crisis in the technological age. Human beings are not entities independent of nature and technology, but part of a system co-constituted with the environment, technology and other organisms. By deconstructing anthropocentric myths and reconstructing non-hierarchical relationships, we can explore the possibility of liberating subjectivity within the technological power network. Cultural ecology, on the other hand, understands the cultural production and transformation of human society through the dynamic interaction of environment, technology and culture, and brings a holistic vision and systematic thinking to technological governance. Julian Steward argues that humans develop specific environmental resources through technological means and form corresponding patterns of behaviour [7], which then influence the evolution of social systems, values and other cultural elements, and therefore advocates evaluating technology within the overall framework of "environment-technology-institution-values", emphasising the ecological relationships of internal elements within the cultural system to avoid ecological imbalances caused by single cultural hegemony.

4 Path Construction: Adaptive Reconstruction of the Educational System

The algorithmic system, as a "meta-medium", deconstructs the traditional identity framework, but it integrates global and local cultural elements through real-time data streams, enabling individuals to reconstruct a "globally localized" identity in cross-cultural dialogues. The digitization and encoding of cultural symbols and cultural memories activates, to a certain extent, the cultural reconstruction ability of digital natives and constructs a "digital memory bank" to counteract civilization rupture. This technology-enabled identity construction is essentially a mechanism for civilization evolution through digital dialectics. Therefore, there is an urgent need for the education system to reshape the paradigm of cultural education in the tension of civilizational evolution: to be wary of the erosion of cultural subjectivity by algorithmic colonization, and to grasp the possibilities of cross-cultural narratives given by smart media.

4.1 Ecological Transformation of Algorithmic Literacy Education: From Tool Cognition to Power Critique

The ecological transformation of algorithmic literacy education necessitates a departure from the cognitive limitations of technological instrumentalism, shifting towards a value dimension of power critique and ecological governance. This requires the construction of a three-dimensional capability framework encompassing data critique, interface deconstruction, and model reflection. The practical path can be broken down into two core modules: (1) Reconstruction of a Critical Curriculum System. The design of algorithmic critique literacy courses involves the development of an "algorithmic literacy" cultivation framework, encompassing three dimensions: data critique, interface deconstruction, and model reflection. Based on Paulo Freire's dialogical practice theory of critical pedagogy, a multi-dimensional literacy cultivation framework is constructed: At the data critique level, with the aid of visualization tools such as Google Teachable Machine, students are guided to construct simple recommendation models, revealing the cultural filtering mechanisms caused by data labeling biases, such as the differential traffic allocation of the "Hanfu" tag by platforms; In the interface deconstruction dimension, by comparing the algorithmic recommendation strategies of TikTok and Douyin International Edition, the cultural power coding in interactive design is deconstructed, such as the diminishing effect of the sliding trigger mechanism on deep cultural cognition; In the model reflection

dimension, the Actor-Network Theory (ANT) analysis paradigm is introduced to systematically track the entire process of cultural data from collection and cleaning to modeling. (2) Systematically cultivate transmedia narrative capabilities. Integrating Henry Jenkins' participatory culture theory with a technological materiality perspective, construct a human-machine collaborative cultural innovation ecology. In practical application, learners are required to utilize generative tools to create digital narrative works that incorporate regional cultural genes, and to construct cross-contextual interactive scripts using natural language processing technology. This training not only strengthens multi-modal expression capabilities, but also, through the reverse analysis of AIGC output results, prompts students to deeply reflect on the translational violence of technological mediation on cultural representation. This transformation essentially reconstructs the "technology-culture" niche through educational mechanisms, elevating algorithmic literacy from skill training to the survival practice of digital citizens. The education system thus becomes an adjuster of the technological ecology, cultivating digital citizens with cultural reflexivity and technological criticality within the tension between instrumental and value rationality.

4.2 Hybrid Construction of Cultural Negotiation Spaces: The Meaning Reproduction of Human-Machine Collaboration

The ecological transformation of algorithmic literacy education requires a move away from the cognitive limits of technological instrumentalism towards a value dimension of power critique and ecological governance. This requires the construction of a three-dimensional framework of literacies that includes data critique, interface deconstruction and model reflection. The practical path can be divided into two core modules: (1) Reconstruction of a critical curriculum system. The design of algorithmic critique literacy courses involves the development of a framework for the cultivation of "algorithmic literacy" that encompasses three dimensions: data critique, interface deconstruction and model reflection. Based on Paulo Freire's theory of critical pedagogy in dialogue practice, a multi-dimensional literacy cultivation framework is constructed: At the level of data critique, using visualisation tools such as Google Teachable Machine, students are guided to construct simple recommendation models that reveal the cultural filtering mechanisms caused by data labelling biases, such as the differential traffic allocation of the "Hanfu" tag by platforms; In the interface deconstruction dimension, by comparing the algorithmic recommendation strategies of TikTok and Douyin International Edition, the cultural power encoding in interactive design is deconstructed, such as the diminishing effect of the sliding trigger mechanism on deep cultural cognition; In the model reflection dimension, the Actor-Network Theory (ANT) analysis paradigm is introduced to systematically track the entire process of cultural data from collection and cleaning to modelling. (2) Paradigm shift in knowledge production models. Breaking through the hierarchical structure of "human-led, machine-assisted" and constructing a hybrid knowledge workshop that facilitates collaboration between "scientists-AI-culture bearers". Researchers use DeepSeek for cross-cultural text mining, while local heirs correct cultural biases in algorithm outputs through digital twin interfaces, ultimately forming a hybrid knowledge graph with cultural roots. Driven by the intelligent enhancement effect, this approach preserves the uniqueness of cultural genes while achieving cross-domain integration of cognitive paradigms. This hybrid construction of human-machine symbiosis essentially pioneers a "third space" of cultural meaning within the educational system - neither purely human-dominated nor algorithmically monopolized - but rather achieves the sustainable evolution of cultural genes through dynamic negotiation, providing a new practical paradigm for meaning reproduction in the era of digital civilisation.

4.3 Governance Innovation in the Multi-Technological Commons: The Symbiosis of Institutional Resilience and Ethical Antibodies

The governance of cultural identity in the age of intelligent technology requires a transcendence of the anthropocentric paradigm, necessitating the construction of a dynamic governance network involving a multi-technological commons. This network is fundamentally based on strengthening institutional resilience to mitigate the risks of cultural homogenisation inherent in technological systems, while deploying ethical antibodies to counter the potential erosion of individual and collective subjectivity by algorithmic power. Specifically: (1) The establishment of an ecological dynamic assessment system. This system must go beyond considerations of technical efficiency and economic viability to include a critical assessment of the impact on cultural diversity and social inclusion. (2)

Promoting the collaborative development of a flexible regulatory framework. At the technological level, the introduction of a "cultural data sovereignty" certification mechanism is crucial, ensuring that educational AI training sets include at least 30% non-mainstream cultural corpora, thereby promoting technological products' understanding and respect for global cultural diversity. At the same time, at the application level, the implementation of ethical embedding design is essential, requiring that all generative tools incorporate cultural safety filters. For example, these filters should automatically identify and correct stereotypical representations or biased content within GPT models regarding the history of minority groups, thereby ensuring the cultural sensitivity and accuracy of technological outputs. Furthermore, at the governance level, the creation of a multi-technology parliament is paramount. This platform should bring together stakeholders from different fields, including anthropologists, technology engineers and indigenous representatives. This parliament will collaboratively formulate algorithmic ethical protocols to ensure that technological advances meet the highest ethical standards while adapting to and promoting the co-evolution of diverse cultures. This interdisciplinary, cross-cultural collaborative approach facilitates the formation of a novel governance model that emphasises the symbiotic relationship between technological norms and cultural ethics, thereby fostering the mutual reinforcement of technological progress and the preservation of cultural diversity.However, it has to be admitted that the cultural governance effectiveness of the education system has inherent boundaries when dealing with algorithmic colonization and data power structure, and future research needs to break through the dimension of education and turn to the cross-domain synergistic governance paradigm of "technological ethics - institutional design - educational innovation", so that we can explore the value symbiosis mechanism of the human-computer civilization in the tension of the civilization's evolution.

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Conflicts of Interest

The authors declare no conflicts of interest.

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文化認同在人工智能時代的雙重困境與教育策略

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摘要：隨著具身人工智能技術的發展，文化認同的生產邏輯已從傳統的「社會-個體」二元框架轉變為更為復雜的「人-機器-文化」三元互動生態系統。本研究批判性地審視了智能時代文化認同構建面臨的雙重疏離困境：一方面，技術權力網絡對文化主體性的系統性消解；另一方面，為保護和促進文化多樣性而迫切需要的教育體系適應性重組。通過融合技術批判哲學與文化生態學的跨學科視角，剖析算法權力如何主導文化意義生產機製，揭露由此引發的文化認同疏離現象。針對這些挑戰，本文提出了應對智能時代文化認同危機的三條具體教育路徑：其一，推動算法素養教育的生態轉型，強調從單純的技術工具認知轉向註重權力批判與生態治理的價值導向；其二，重構人-機器文化協商協同空間，借助技術中介激活文化意義的動態再生產，實現持續的意義生成；其三，構建多元技術共同體參與的動態治理網絡，旨在增強製度韌性並通過嵌入倫理抗體共同抵禦技術系統所帶來的文化同質化風險。這些策略不僅為當前文化認同構建困境提供了新的解決方向，也為教育體系更好地適應新技術環境提出了切實可行的路徑。

關鍵詞：人工智能技術；文化認同；算法素養教育

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