International Journal of Information Systems in the Service Sector
Volume 17 • Issue 1 • January-December 2026

Culturally Adaptive AI Digital Humans for Cross-Border Service Delivery

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Received: December 5th, 2025 | **Accepted:** January 27th, 2026

ABSTRACT

AI digital humans are increasingly used as intelligent self-service interfaces in global service sectors such as customer support, tourism, and digital government. However, their effectiveness is often limited by poor cultural adaptability, leading to miscommunication and reduced user trust. This study proposes a cross-cultural intelligent adaptation model that integrates context awareness, cultural filtering, and user feedback to enhance service interactions across cultural boundaries. Empirical results from multicultural user tests show significant improvements in communication accuracy and customer satisfaction. The findings offer practical guidance for service organizations deploying culturally sensitive AI agents to improve cross-border customer experience.

KEYWORDS

AI Digital Human, Cross-Border Service Delivery, Customer Experience, Culturally Adaptive Interaction, Intelligent Self-Service Systems

INTRODUCTION

With the rapid evolution of artificial intelligence technology (AI), AI digital humans have gradually entered the public eye and are showing an increasingly important position on the international communication stage (Guzman & Lewis, 2020). They can not only achieve multilingual dialogues; they also adjust their language style, expressions, and behaviors according to different cultural environments (Zhu, 2024). This flexibility has greatly broadened the boundaries of AI digital humans' cross-cultural communication (Huang, 2024). For many organizations, AI digital humans have long become a bridge in the global communication strategy (Anattasakul et al., 2023). Through multimodal content output, they have effectively broken the time, space, and cultural boundaries of traditional media (Hafner, 2015). In terms of experience upgrades, knowledge sharing, and brand building, AI digital humans have released innovative energy that cannot be ignored (Jarrahi et al., 2023).

However, technological leaps have not eliminated the cultural barriers that AI digital humans face. In fact, every cultural collision may lead to semantic misunderstandings or value conflicts (ÓhÉigeartaigh et al., 2020). In the past, academia focused on technology optimization and algorithm innovation, often ignoring the "implicit context" in cross-cultural communication—such as cultural customs, social symbols, and the difficulty of transmitting nonverbal signals (Wang & Huang, 2024). At the same time, users' trust boundaries in AI digital humans, moral and ethical disputes, and data security issues have also become the focus of the global governance system (van de Hoven et al., 2021).

DOI: 10.4018/IJISSS.400783

The complexity of cross-cultural interaction further demands that AI digital humans not only understand linguistic differences but also interpret the nuanced socioemotional cues embedded in communication practices across cultures. For instance, concepts such as high-context versus low-context communication styles, power distance, individualism versus collectivism, and uncertainty avoidance significantly influence how messages are perceived and interpreted (Liu et al., 2011). Without a deep understanding of these dimensions, AI systems risk misrepresenting intentions or failing to resonate with audiences from diverse backgrounds.

Moreover, the integration of emotional intelligence and cultural sensitivity into AI models remains underexplored, despite its critical role in enhancing human-AI interaction (Barnes & Hutson, 2024). Emotional intelligence involves recognizing, interpreting, and responding appropriately to users' emotions, while cultural sensitivity entails adapting behavior based on the cultural norms of the interlocutor. These capabilities are essential for fostering empathy and trust in digital interactions, particularly when engaging with users who may come from emotionally expressive or reserved cultures.

In addition to technical challenges, there are significant ethical considerations surrounding the deployment of AI digital humans in cross-cultural settings. Issues such as bias in training data, representation of minority voices, and the potential reinforcement of stereotypes must be carefully addressed to ensure equitable and inclusive communication (Amarachi & Joseph, 2023). Furthermore, transparency in how decisions are made within AI systems is crucial for maintaining user trust and ensuring accountability, especially in sensitive intercultural contexts.

The challenge lies not only in technical accuracy but also in understanding the sociocultural dynamics embedded in communication (Peine & Herrmann, 2012). Therefore, interdisciplinary collaboration between AI developers, anthropologists, linguists, and ethicists is essential for advancing this field (Govia, 2020). By combining expertise from various domains, researchers can develop more holistic frameworks that address both the functional and relational aspects of AI-human interaction.

In view of this, this article focuses on the role and challenges of AI digital humans in cross-cultural communication, combining theoretical analysis with model analysis to explore the limitations of current mainstream methods (Guetterman et al., 2019), and focus on proposing more intelligent and adaptive innovation paths (Cao et al., 2020). I believe that this will not only help broaden the theoretical extension of AI technology but also inject practical solutions into global cultural communication (Chu, 2024). Additionally, the integration of emotional intelligence and cultural sensitivity into AI models remains underexplored, despite its critical role in enhancing human-AI interaction (Li & Yang, 2024).

Future research should also consider the evolving nature of culture itself—how AI digital humans can adapt not only to static cultural frameworks but also to dynamic, hybrid identities shaped by globalization and digital connectivity. As societies become increasingly interconnected, the ability of AI systems to navigate fluid cultural landscapes will be key to their success in international communication (Huang & Yeoh, 2011; Wang et al., 2025). For instance, in international tourism guidance, an AI digital human must adjust its recommendations, tone, and nonverbal cues—such as avoiding direct eye contact for East Asian visitors while using expressive gestures for Latin American tourists—to ensure both cultural comfort and service effectiveness.

Ultimately, the development of culturally competent AI digital humans represents a significant opportunity to enhance global dialogue, foster mutual understanding, and support inclusive digital ecosystems. However, achieving this vision requires sustained investment in research, ethical design principles, and collaborative efforts across disciplines and borders.

LITERATURE REVIEW

In recent years, research on AI digital humans in the field of cross-cultural communication has gained increasing attention. As AI technologies continue to evolve, AI digital humans—virtual agents capable of simulating human interaction—are being deployed across various domains such as

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