Embodiment and Immersion: A Study on the Communication Effect of AI-Driven Virtual Digital Humans in Film and Television New Media Narratives

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Abstract: This paper focuses on the communication effects of AI-driven virtual digital humans in the narrative of film and television new media, with "embodiment" and "immersion" as the core research dimensions. By examining the intervention logic of virtual digital humans in film and television new media narratives, this paper explores the mechanism by which they rely on multimodal interaction to enhance embodied communication and use technology to empower immersive experiences. At the same time, it analyzes the existing problems in current communication practices, reveals the impact paths of embodiment and immersion on communication effects, and provides theoretical references and practical insights for optimizing the application strategies of AI virtual digital humans in film and television new media narratives and enhancing content communication efficiency.

Keywords: AI-driven; Virtual digital human; Film and television new media narrative; Communication effect

1. Introduction

AI-driven virtual digital humans have gradually become an important carrier for film and television new media narratives in the development process of the current digital era, reshaping content dissemination forms and audience experience modes. Although virtual digital humans have injected new vitality into film and television new media narratives, how to enhance dissemination effects by strengthening embodied interaction and constructing deep immersive experiences remains a problem that we need to actively face, in order to enable audiences to immersively experience virtual narratives. This article takes embodiment and immersion as entry points to systematically explore the dissemination effects of AI virtual digital humans in film and television new media narratives, in order to provide theoretical support for industry development.

2. The communication significance of AI-driven virtual digital humans in the narrative of film and television new media

2.1. Deepening the connotation of embodied communication theory in the era of intelligent media

Marshall McLuhan's theory of "the medium is the extension of man" provides important insights for the study of intelligent communication. In the era of intelligent communication, media is no longer in the physical sense, but rather a medium that connects human intelligence and artificial intelligence, the physical world and the virtual world through data. Each individual is a unit of intelligent communication. AI-driven virtual digital humans use multimodal affective computing, real-time motion capture, and intelligent interaction technology to restore human emotions and physical behaviors, elevating the audience's participation in communication to a multi-sensory experience. The audience not only perceives the virtual digital human image and physical actions through vision, but also establishes instant emotional connections and behavioral interactions with the virtual digital human through voice, text, and even physiological data feedback. This interaction is not indirect communication at the symbolic level, but rather a "somatic experience" closer to real interpersonal communication [1].

2.2. Promote innovation in content production models for film and television as well as new media

The content production model of traditional film and television new media exhibits characteristics of "centralization, standardization, and unidirectionality", with the creative team as the absolute core. Standardized content is produced according to a fixed narrative logic and ultimately delivered to the audience in a unidirectional manner. The audience remains in the role of "passive receivers", making it difficult to form an interactive closed loop between content production and dissemination. The intervention of AI-driven virtual digital humans promotes the innovation of the content production model of film and television new media from three levels: production subject, production logic, and production relations. It builds a new production system that is "decentralized, personalized, and interactive", making content production more aligned with market demands and enhancing the dissemination vitality and market competitiveness of film and television new media content [2].

2.3. Exploring the future narrative paradigm of human-machine symbiosis

Intelligent communication has achieved focused and precise dissemination of information, making individuals the mainstay in the dynamic communication chain and enhancing the efficiency of information dissemination. The continuous innovation of intelligent communication technology has brought opportunities for the development of the era of intelligent communication. The era of intelligent communication is a "metaverse" level application built on big data and centered around artificial intelligence technology. AI-driven virtual digital humans are the explorers and practitioners of the "human-machine symbiotic narrative" in this exploration and practice process, utilizing the deep interactive relationship of "human-virtual digital human-narrative content" to propose exploratory directions for the construction of future narrative paradigms. The development of AI-driven virtual digital humans in the narrative of new mainstream media in film and television has not only become an innovative practice of current communication methods but also a prelude to the future form of human-machine symbiotic narrative, providing a possible basis for the future development of media narrative.

3. The current status of AI-driven virtual digital humans in the narrative of film and television new media

3.1. Technical bottlenecks lead to awkward "embodied interaction" and insufficient emotional resonance

Digital embodiment has transformed the traditional spatiotemporal logic of "I am here", altering the communication relationships between people, people and objects, and objects through the virtual-real interactive relationship of the "metaverse". In the context of intelligent communication, we need to conduct a detailed analysis of the concepts of "human-computer interaction" and "interaction". Currently, AI's sentiment analysis of audiences mostly relies on explicit information, such as voice tone and facial expressions, to judge the emotional state of the audience, making it difficult to perceive implicit emotional information, such as micro-expressions and physiological changes, which leads to errors in sentiment judgment. The logic of emotional feedback generation is relatively simple, mostly following preset algorithms to match specific responses, making it difficult to generate reactive feedback based on the complexity of the storyline and the subtlety of the audience's emotions. Consequently, the emotional feedback of virtual digital humans exhibits a "template-like" characteristic, with action performances and body expressions limited by motion capture technology and AI rendering capabilities. The body movements of virtual digital humans have a "stuttering" and "mechanical" feel, while facial expressions exhibit problems of "exaggeration" and "blankness" [3].

3.2. The narrative function tends to be "instrumentalized" with a notable lack of character subjectivity

In the current narrative practices of film and television new media, AI-driven virtual digital characters are often positioned as "functional," with their narrative value limited to instrumental aspects such as attracting traffic, information transmission, and interactive embellishments. They lack the subjectivity and dimensionality that should be inherent to narrative roles, and this "instrumentalization" tendency severely restricts the release of their communicative value. Creators often assign single superficial labels to virtual digital characters, lacking the construction of deep dimensions such as character personality, growth background, values, and behavioral logic, rendering the characters as visual symbols with only external appearances and no internal personality, making it difficult for audiences to generate emotional identification. Virtual digital characters are mostly used in functional scenarios such as opening, information broadcast, and simple interactions, and only occupy a "peripheral position" in the core narrative process, lacking the core role of driving plot development, participating in conflicts, and carrying narrative themes. For example, in interactive dramas, virtual digital characters are only responsible for initiating interactive commands, but do not participate in plot twists and emotional expression, reducing them to "interactive tools" rather than "plot participants" [4].

3.3. The communication mode is unidirectional, and the audience's "immersion" is easily interrupted

In current practice, most film and television new media narratives involving virtual digital humans have not yet escaped the shackles of one-way communication. The audience's participation and control rights are limited, and immersive experiences are easily interrupted by various factors, resulting in the innovation effect of the communication mode not meeting expectations. The current so-called interactive communication is mostly pseudo-interactive. Although virtual digital humans can initiate interactive commands, the audience's choice range is strictly limited within a preset framework. No matter what choice the audience makes, it will ultimately

lead to a fixed narrative outcome. This "formalized interaction" makes the audience's sense of participation superficial, making it difficult to generate an immersive experience of "controlling the narrative". At the same time, there are numerous immersion interruption points in the communication process. On the one hand, technical issues such as interaction delays and content loading stalls directly break the audience's narrative immersion state, pulling them away from the narrative context. On the other hand, the "disconnection between interaction and narrative" at the content level can also lead to a loss of immersion. The interaction design of virtual digital humans has low relevance to the core narrative theme, such as inserting unrelated entertainment-style interactions into suspense narratives. The one-way nature of the communication mode is also reflected in the "lack of a feedback loop": the audience's interactive feedback and emotional expression are difficult to effectively integrate into subsequent content production. Creators still dominate the narrative direction with their own will, and the value of audience participation is not fully respected [5].

4. Communication strategies of AI-driven virtual digital humans in film and television new media narratives

4.1. Enhance multimodal affective computing to create embodied interactions that convey "true feelings"

We need to recognize that cognition, emotion, and physical state and activity of the body are inextricably linked. It is important to understand that the audience's emotional engagement and understanding of narratives do not solely stem from the brain's decoding of linguistic information, but also rely on the perception and empathy towards the entire embodied performance of the narrative subject. A digital human who can only speak fluently but has rigid expressions and mechanical movements will create a "uncanny valley effect", which hinders the transmission of emotions. The key to enhancing its communication effectiveness lies in endowing it with embodied interaction capabilities of "true feelings" through multimodal affective computing technology. AI systems are required not only to process text and speech, but also to integrate visual, auditory, and even contextual information for comprehensive emotional judgment and generation [6].

Another example is the popularity of the domestic hyper-realistic virtual image "Liu Yexi," which preliminarily demonstrates the powerful dissemination of embodied interaction. In her released short videos, precise facial expressions and appropriate body movements are deeply integrated with the plot and emotions. For instance, in one of her scenes, the contraction of pupils and the tightness of the mouth corners when facing panic, as well as the gentle touch of her hands when showing pity, greatly enhance the narrative appeal. If combined with multimodal affective computing, it can produce a deeper effect. Imagine if an AI virtual actor performs a farewell scene with complex emotions. This kind of deep and internal emotional expression can penetrate the screen in a second, allowing the audience to not just "hear" a line, but to "feel" the character's inner melancholy and reluctance, generating a very strong emotional resonance and greatly optimizing the breadth and depth of narrative dissemination [7].

4.2. Establish a profound persona and growth arc, achieving the transformation from a "tool" to a "character"

In the past, narratives relied on screenwriters' shaping and actors' secondary creation to convey character depth. If AI virtual digital humans only remain at the level of character modeling, they will become mere "means symbols" designed for brand promotion and information dissemination, unable to undertake narrative tasks

with complex meanings[8]. To transform virtual digital humans from "means symbols" into "characters", it is necessary to create a reliable "story world" background for them, including their prehistory, motivations, values, flaws, and desires, as well as a clearly identifiable "arc", that is, the character's experience of events and inner growth in the story[9].

For example, the character of Xiangwan, a member of the virtual human group "A-SOUL", is portrayed as someone who loves playing games, is a little tsundere, but also very hardworking and sincere. After fans have interacted with her through long-term live streaming, she responds to fans and accepts challenges, making Xiangwan's image more three-dimensional and creating a sense of "growing up together"[10]. If we want to go deeper, we can design an AI virtual protagonist "Xinghuan" specifically created for the series. Before the show starts, the production team sets up a vast background information for her through AI, such as that she is an alien orphan who suffered a tragic childhood, causing her to fear intimate relationships. Her basic desire is to gain a sense of belonging and recognition, but her personality flaw is an innate tendency to avoid. Therefore, when the series reaches a point where one of the characters tries to forge a deep friendship with "Xinghuan", the AI will not just give you an answer of acceptance or rejection, but will form a series of responses that fit her "avoidant personality" habits based on "Xinghuan's" underlying personality database, such as "I - I don't know, I'll tell you later", "Let's talk about it next time", "Do you understand? No?" And even at critical moments, she chooses to avoid responsibility and bear it alone. Later, as the plot progresses, at this crucial moment, after her companions risk their lives to save her, she finally experiences the "arc light of Xinghuan" [11].

4.3. Design branching narratives and real-time interactions to construct an immersive narrative field featuring "audience participation"

Traditional film and television narratives are linear, unidirectional, and "author-centered" in their dissemination, with the audience at the passive receiving end. The immersion experience is easily disrupted by the mismatch between the narrative and personal expectations. However, the combination of AI-driven virtual digital avatars, branching narratives, and real-time interaction transforms the narrative into an open, variable "field of meaning negotiation," breaking the fourth wall and inviting the audience to shift from being "viewers" to "participants" or even "collaborators"[12] .AI systems can capture and analyze collective feedback data from the audience in real time, and use this to drive virtual digital avatars to adjust narrative strategies or choose different plot branches. This not only gives the audience an unprecedented sense of agency and control but also creates a strong psychological involvement where "the narrative changes because of me" [13].

For example, the interactive drama "Black Mirror: Bandersnatch" is an early attempt at branching narratives, but its branching options are preset. Combining AI and virtual digital humans can envision more advanced applications. For instance, in a suspenseful interactive live broadcast drama hosted by the virtual anchor "Li", the plot reaches a critical juncture where the real culprit is about to be revealed, but the evidence points to two characters[14]. At this point, AI will not directly advance the plot. Instead, "Li" will turn to the camera and interact with the audience based on real-time comments and live room voting, asking, "Do you think we should investigate the silent butler first, or the emotional mistress? Your choice will determine what we discover next." The AI system quickly tallies the audience's choices and activates different plotlines accordingly. Furthermore, when the audience suggests a creative deduction that the screenwriter did not preset in the comments, AI can analyze its reasonableness in real time and prompt "Li" to respond, such as her eyes lighting up and saying, "This detective's idea is interesting! We did overlook that detail before. Let's go and check it out now!" [15].

5. Conclusion

In summary, embodiment and immersion, as core dimensions, profoundly influence the dissemination effect of AI virtual digital humans in film and television new media narratives. Virtual digital humans expand the boundaries of embodied communication through technological empowerment, construct immersive narrative fields, and provide new paths for enhancing content attractiveness and audience engagement. However, issues such as technological limitations and role positioning deviations still constrain the release of communication value. In the future, it is necessary to strengthen the foundation of embodied interaction through technological optimization, enhance emotional connection through deep role construction, improve immersive experience through interactive design, and promote the deep integration of virtual digital humans with film and television new media narratives.

Disclosure statement

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