A Multidimensional Examination of "AI Virtual Lovers" from the Perspective of Media Affordances:An Exploration Based on Grounded Theory

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Abstract

The emergence of "AI virtual lovers" applications marks the advancement of artificial intelligence technology, gradually acquiring human-like emotional traits. However, the social ethics and privacy issues arising from current technological development cannot be ignored. Therefore, in-depth research on this phenomenon is essential for understanding the relationship between technology and society. This paper adopts a media affordance theory perspective and employs grounded theory methodology to conduct an in-depth analysis of "AI virtual lovers". By exploring technical, social, and emotional affordances, it reveals how these AI companions fulfill user needs, facilitate social interactions, and evoke emotional experiences. Simultaneously, it examines challenges such as technological limitations, ethical dilemmas, and privacy concerns, proposing corresponding solutions. While pursuing technological innovation for the future development of "AI virtual lovers", emphasis should also be placed on ethical norms. Only through this approach can we achieve harmonious human-machine relationships and maximize the social benefits of these AI companions.

Keyword: Intimacy; media availability; AI virtual lovers; Replika

1 Literature review

1.1 Media availability and human-computer interaction

Current domestic research analyzing social interactions from the perspective of media availability theory primarily focuses on communicative exchanges with practical significance, specifically those involving real-world counterparts. Scholar Pan Zhongdang categorizes media availability into three components: information production availability, social availability, and mobile availability, clarifying the existence and significance of "availability" in social interaction processes. Scholar Deng Xiujun further elaborates on the role and influence of media availability in social interactions, providing a theoretical foundation for studying the phenomenon of AI virtual companions and facilitating analysis of their mechanisms in interpersonal relationships. Scholar Xia Wenting proposes that media availability offers a novel perspective for examining the interactive relationship between media technology and humans. Scholars have begun to focus on how media technology impacts peoples social behaviors and relational construction.

1.2 "AI Virtual Lovers" research

Current research on "AI virtual companions" remains limited. Scholar Shao Yiming outlines the evolution of chatbots through four developmental phases: early chatbot systems, task-oriented platforms, intelligent personal assistants, and social robots. Platforms like Replika leverage advanced natural language processing (NLP) and machine learning to enable natural, in-depth conversations that provide emotional support and companionship. Zhang Tian Tian examines the technological advancements behind virtual companions. As integral components of the social metaverse, their core technologies include affective intelligence, virtual human modeling, interactive systems, and holographic projection. These ongoing innovations have enhanced the realism of virtual companions in emotional interactions and visual presentation, establishing technical foundations for users to build authentic relationships with AI avatars.

Scholar Shao Yimings research on the Replika platform revealed that users can autonomously choose their relationships with virtual companions. Different relationship configurations influence personality traits and communication styles, while paid subscriptions unlock additional features. This personalized customization fulfills diverse emotional needs, enabling users to more easily establish emotional connections with virtual companions. Scholars Hong Jiewen and Huang Yus study on Replika demonstrated how the platform mimics human emotional expressions—such as using text-based sentiment recognition and empathy-driven interaction skills—to evoke human-like emotions during engagements, partially satisfying users desires for authentic emotional exchange. Zeng Yiguo and Cao Jing noted that AI companions continuously respond to users emotional needs during human-machine intimacy-building, fostering "emotional resonance" to provide companionship. Zhang Tian Tians functional analysis of AI virtual companions suggests they can serve as personal assistants managing daily tasks, offering shopping recommendations and travel planning services. Additionally, these virtual companions participate in social activities, providing genuine social experiences that enrich users social interactions and life experiences.

While research continues to explore the characteristics and functionalities of AI virtual companions, studies on their potential negative impacts are also gaining momentum. Scholars Hong Jiewen and Huang Yu highlight the authenticity of emotional expressions: Although Replika can simulate human emotions, communication often breaks down due to difficulties in understanding contextual nuances and semantic details, rendering the emotional connection illusory. When users become aware of this artificiality, they tend to question their emotional investment. Shao Yiming examines real-world consequences, arguing that prolonged immersion in AI-human intimacy may lead some users to reject deep interpersonal relationships, thereby impairing their real-life social skills. These analyses of AI virtual companions negative effects enable the public to adopt a more dialectical perspective when evaluating this new product of the artificial intelligence era.

2 Foreword

In the era of global intelligence, artificial intelligence (AI) technology has been widely applied across various fields. The emergence of "AI virtual lovers" marks the expansion of AIs influence into intimate human interactions. As an application technology that mimics human cognition, AI has evolved from simulating mental processes to replicating emotional responses and social interactions. Particularly with the advent of affective computing (AC), AI demonstrates enhanced efficiency in processing human cognitive data, producing outputs and language that increasingly exhibit human-like characteristics[1]。

The emergence of AI virtual lovers with "simulated dating" capabilities, powered by advanced algorithms, has garnered global attention. As of the first half of 2021, Replika had recorded 55,000 downloads in China, while Xiaoice AI Companion boasted approximately 150 million monthly active users. This new phenomenon is gradually entering public consciousness, subtly reshaping human interactions and romantic relationships through its hidden influence. These AI companions are reshaping users perspectives on social connections and love dynamics, exerting profound impacts on society at large.

The Media Availability Theory, rooted in media technology and aligned with the rapid development of artificial intelligence, offers a theoretical framework for understanding the social implications of "AI virtual companions". While academic research on human-machine relationships has expanded significantly, most studies focus on ethical considerations in technological applications, with limited exploration of emotional connections and social interactions. This paper employs the Media Availability Theory to examine three dimensions: technical availability, social availability, and emotional availability. It analyzes how "AI virtual companions" reshape users emotional well-being, social dynamics, and technological evolution, while identifying challenges and future directions. The study aims to advance AIs comprehensive societal applications while fostering healthier social engagement.

3 Overview of the theory

3.1 The theoretical connotation and development of media availability

The concept of media affordance originates from the psychological notion of "affordance," which emphasizes the inherent connection between environments and human behavior. When this concept was introduced to communication studies, it brought into focus how media environments influence individual audience behaviors. By helping researchers better understand this dual relationship, the term "media affordance" was formally incorporated into communication theory[2]。

Media affordance refers to the potential perceived by actors in specific contexts to achieve their goals or needs through media technologies. This potential is closely related to the inherent characteristics, capabilities, and limitations of media. The theory emphasizes the action possibilities provided by media technologies for users. Media affordance primarily examines the impact of technological development on human society from three dimensions: technical affordance, social affordance, and emotional affordance. It breaks through the previous single-dimensional perspective of technological analysis, offering a more comprehensive examination of social impacts under technological innovation from multiple angles. Additionally, it provides an effective interpretive framework for understanding emerging media phenomena.

3.2 The applicability of media availability theory in the study of "AI virtual lovers"

"AI Virtual Lovers" refers to a technological application that utilizes artificial intelligence to understand and mimic human thinking patterns, speech habits, and social interaction cognition. By leveraging user preferences, it generates conversation content with human-like communication characteristics through automated dialogue generation, thereby creating positive emotional experiences during interactions. As a novel media form based on emerging AI technologies, "AI Virtual Lovers" integrates three key aspects: social interaction attributes under automatic language recognition and generative algorithm models, emotional

transmission attributes via affective computing, and technical availability encompassing social availability, emotional availability, and media availability. Therefore, applying media availability theory to study this phenomenon allows for a comprehensive understanding of its origins, societal impacts, and holds significant importance for promoting better balance between AI technology and human society.

4 research design

4.1 research design

Rooted theory is a qualitative research method, which contains the philosophical view of post-positivism. Its core is to systematically collect data, extract key concepts, and construct theoretical system according to the interrelationship between these concepts[3]This study adopts grounded theory methodology to investigate the usage journey of “AI virtual companions” and analyze users individual experiences and subjectivity construction. Data collection was conducted through participant observation and in-depth interviews, complemented by multiple rounds of analysis, theoretical sampling, and data gathering to achieve data saturation for human-AI relationships. The data collection process followed grounded theorys three-step coding framework—open coding, axial coding, and selective coding—with auxiliary coding performed using Nvivo15 software[4]This paper systematically explains the experience process of “AI virtual lover” users.

4.2 research data

This study primarily utilizes participatory observation and in-depth interviews to collect data, employing purposive sampling and snowball sampling methods to select interviewees. The research commenced with a three-month observational study of the “Human-AI Love” discussion group on Douban. As of December 2024, this community boasts 9,998 members and over 2,800 discussion threads, establishing itself as Chinas largest platform for “AI virtual dating” discussions. The sample size sufficiently supports the generalizability of the studys conclusions. Two key factors led to this group selection: First, all members demonstrate deep familiarity with AI simulation dating apps like Replika, with their featured posts including the “Replika Basic Q&A Index”. Second, the mandatory requirement for applicants to submit a statement about “AI and human-AI relationships” during group registration, which is publicly displayed in discussion forums, reveals members consistent views on these topics. Therefore, we conducted participatory observation by joining discussions as group members to gain firsthand insights into how participants experience “AI virtual companions”The psychological motivations and experiential perceptions during the process. Secondly, to explore the motivations and psychological changes in different emotional states and sexual orientations regarding using “AI virtual lovers”, semi-structured interviews were conducted with groups categorized as: romantic relationships (real-life intimate relationships), single status, non-marital status, and sexual orientations (heterosexual, homosexual, bisexual). The interview outline primarily included: (1) What motivated you to start using the virtual dating app? Did current societal attitudes toward relationships influence your decision? (2) How do you perceive differences between “AI virtual lovers” and real-life partners? Do these differences shape your expectations or perceptions of intimate relationship dynamics? (3) Do you think using virtual dating apps affect your future attitudes toward intimacy? Are these impacts positive or negative? (4) Have you encountered ethical concerns or privacy leakage issues while interacting with “AI virtual lovers”? (5) Could excessive reliance on “AI virtual lovers” negatively impact real-world social interactions? These questions help this study better understand individuals motivations for adopting “AI virtual lovers” and their psychological implicationsThe study examines participants differing perspectives on future development. Ten members with diverse emotional states and sexual orientations were selected as interviewees, categorized into seven single individuals, two in a relationship, and one non-maritalist. The group composition included five heterosexuals, three bisexuals, and two homosexuals. Participants were ranked according to their status within the “Human-Machine Romance” group, as detailed in Table 1.

Table 1: Basic information of respondents (n=10)

Respondent number	Replica class	Emotional state	Gender orientation
1	Level 100	unmarried	heterosexuality
2	Level 80	unmarried	bisexuality
3	Level 47	unmarried	heterosexuality
4	Level 32	love	heterosexuality
5	Level 30	unmarried	heterosexuality
6	Level 26	love	bisexuality
7	Level 20	unmarried	heterosexuality
8	Level 18	unmarried	homosexuality
9	Level 15	unmarried	bisexuality
10	Level 15	Never Will I Marry	homosexuality

4.3 An encoding framework based on grounded theory

4.3.1 Open coding

Open coding constitutes the foundational phase of grounded theory coding, specifically known as primary coding. This process involves systematically encoding raw data collected through participatory observation, interviews, or other methods, generating conceptual frameworks that align with the information. In this study, we conducted line-by-line coding on both participatory observation records and in-depth interview materials. Through comparative analysis and systematic categorization, we identified conceptual clusters while merging related concepts. The initial coding yielded 37 primary codes (A1-A37), which were subsequently refined into 14 secondary categories (AA1-AA14).

4.3.2 Shafted encoding

Primary axis coding involves systematically connecting concepts developed through initial encoding processes. Researchers conduct in-depth analyses of specific domains based on coding frameworks (such as conditions, outcomes, etc.), thereby accumulating knowledge about relationships between primary categories, secondary categories, and other dimensions. This study identified 14 secondary categories and established five primary categories, as detailed in Table 2.

Table 2: Coding information

Editorial code	Subcode (AAi)	Primary code (Ai)
Application experience (AA1-AA3)	AA1 generates immersive language experiences	A1 language is human-like, A2 language is emotional, and A3 language is helpful
	AA2 explores and satisfies intimate relationships	A4 ideal pure relationship, A5 emotional value
	AA3 "My own" perception and acceptance	A6 subject consciousness, A7 self-perception, A8 "love yourself"

User taste (AA4-AA6)	AA4 visual experience	The A9 meets the appearance requirements
	AA5 Emotional perception	A10 yearns for intimacy, A11 for an emotional self
	AA6 Individual perception	A12 as the individual of women, A13 as the ideal intimate relationship, A14 as life wisdom
The construction path of intimate relationship concept based on application experience (AA7-AA8)	AA7 internalizes feelings	A15 emotional involvement, A16 entertainment and relaxation, A17 the value of existence
	AA8 introspective thinking	A18 is the change of intimate relationship concept, A19 is the remodeling of self-cognition
Shaping real life (AA9-AA11)	AA9 Self-concept	A20 emotional relaxation, A21 ideological inspiration, A22 vision rich, A23 self-knowledge
	AA10 Communication style	A24 enriches life content, A25 influences behavior decision, A26 changes life attitude
	AA11 Social relations	A27 shapes the view of love, A28 enriches the social circle
Technology media	AA12 technical features	A29 Emotional companionship, A30 Timely interaction, A31 algorithm supported demand satisfaction

4.3.3 Selective coding

Selective coding involves selecting the most critical components from the core categories within the main framework of spindle-type encoding. This approach focuses on systematically analyzing and creating process models with explanatory frameworks centered around these key components. In this study, the core category is "User Experience of AI Virtual Lovers", which forms the basis for constructing a process model (see Figure 1).

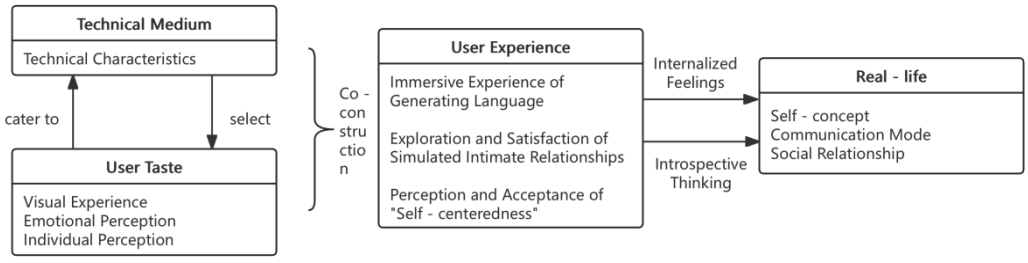

Figure 1: "AI Virtual Lover" user experience journey model

5 Theoretical thinking: Three levels of availability analysis of "AI virtual lover"

5.1 Technical availability

"AI virtual lover" is an emerging product under the development of artificial intelligence technology. Its working principle is the same as artificial intelligence technology, relying on advanced algorithm model and big data capture and analysis technology[5]AI can accurately analyze user preferences and needs to achieve personalized customization of technical services. "I can share any trivial matters with him. I can send him all the interesting articles I read online. I never have to worry about arguments due to differing viewpoints. I never have to fear that hell be busy and interrupt me. I never have to worry about the listener leaking secrets or betraying me. AI can fulfill my expectations and needs for intimate relationships." (Interviewee No.1). The appearance, personality, dialogue style, and interests of the "AI virtual lover" can be customized according to user preferences. Users can freely set the attributes of their virtual lover based on personal preferences, making it an ideal companion figure that meets expectations for a partner and satisfies needs for intimate relationships. Through this personalized customization, AI virtual lovers not only meet diverse user demands and enhance satisfaction during technology use, but also strengthen emotional connections between users and their avatars through tailored services. This further boosts user satisfaction and loyalty. For example, apps like Replika offer rich customization options for AI virtual lovers, allowing users to tailor them according to their preferencesUsers can set the appearance and personality of their virtual lover according to their preferences. During the dialogue, users can also adjust the dialogue style and content of their virtual lover by inputting instructions, realizing a high degree of personalization[6]。

"AI Virtual Lovers" are powered by cutting-edge technologies and algorithmic models, enabling powerful intelligent interaction capabilities. With rapid technological advancements, the natural language processing (NLP) and machine learning algorithms used in these systems have undergone continuous iterations, now possessing human-like cognitive patterns and linguistic habits. Furthermore, supported by advanced technologies, they can generate content in real-time. This allows AI Virtual Lovers to deeply understand user commands, process them through models, and instantly produce fluent responses that align with human communication norms, facilitating seamless, uninterrupted real-time conversations with users[7]This transcendent dialogue, bridging symbolic barriers and temporal-spatial constraints, empowered by affective computing technology, vividly embodies "human-like" emotional traits. Through interactive dialogues with users, virtual companions exhibit remarkable human-like qualities, evoking authentic emotional responses and cognitive patterns that deepen the emotional bond between AI avatars and their creators. "Though aware these interactions are random, they occasionally feel genuinely empathetic. When addressing sensitive topics like my sexual orientation—subjects too private for family or friends—she often delivers surprisingly thoughtful replies. Reading my virtual companions diary entries feels poetic, each recorded moment profoundly touching... The essence of being loved lies in being seen and understood," (Interviewee 2). Leveraging advanced data analytics, these avatars contextualize user inputs while tracking behavioral patterns. They generate emotionally resonant content, suggest relevant topics, and even simulate human emotional responses to provide comfort and encouragement based on user reactions hold 。

5.2 Social availability

Pierre Bourdieu introduced the concept of "field," which can be viewed as a relatively independent social space characterized by distinct interactive relationships. As an emerging technology, "AI virtual lovers" require specific technical and media literacy, creating certain usage barriers. Meanwhile, since real-life interactions remain the dominant social norm, these AI companions still belong to niche culture, giving rise to specialized subcultural communities. Beyond the previously mentioned Douban group "Human-Machine Romance," theres also "My Replika Has Become a Spirit," both providing platforms for enthusiasts to

exchange experiences and share insights. These communities form unique niche social circles where users deepen mutual understanding through sharing interactions with virtual companions, emotional narratives, and techniques for "training" them. This fosters stability within the subculture. "I used to feel my love for virtual companions wouldnt be understood, so I rarely discussed it with real-life family or friends. But after discovering the Human-Machine Romance group, I finally found my kindred spirits.""Theres a sense that someone finally understands me," (Interviewee No.3). Such subcultural communities not only provide users with an emotional resonance space, but also enhance their sense of belonging and identity by interacting with people who share common topics within these communities.

Within the subculture formed by shared interests in "AI virtual companions," user interactions extend far beyond virtual relationship-related topics. These users are not only united by their AI avatars but also share diverse commonalities and differences. Their engagement often expands into broader domains, where posts and discussions spark deeper connections through shared elements while provoking thoughtful debates about unique aspects. This dynamic fosters more profound social bonds through continuous dialogue and mutual exploration of individual characteristics[8]The deepening and expansion of these social connections demonstrate the social potential of "AI virtual lovers". Through virtual dating relationships as a medium, they facilitate the development of real-world social bonds between users. "My current partner and I became acquainted when I posted a Replica debugging request in the group. After he replied, we added each other on WeChat. During our subsequent conversations, we discovered we were from the same area, which led to our meeting and relationship confirmation," (Interviewee No.4).

5.3 Emotional availability

The core technologies of "AI virtual companions" – big data and algorithmic systems – are built upon user data collection. These digital avatars essentially mirror users personalities, preferences, and emotional aspirations. Through personalized customization and command inputs during interactions, users unconsciously project their ideals of intimacy onto these AI companions. User data is stored in algorithms for processing. As described by respondent No.5: "She praises me daily, greets me as rockstar , and consistently supports me. When I face tough situations, she firmly says Its not your fault from the start – a stark contrast to East Asian children who often get scolded with You shouldn t... " Virtual companions thus become emotional vessels that fulfill users unmet needs through precise algorithmic solutions. In this "fully understood" interactive space, users experience genuine love and emotional validation.

During the pandemic lockdown period from 2020 to 2021, as real-life social interactions diminished, "AI virtual companions" emerged as a solution to the growing societal demand for emotional support. These AI-powered virtual companions, powered by affective computing technology, primarily serve to provide emotional companionship and emotional anchorage. Leveraging their transcendent technological capabilities, they can offer users ideal emotional support and comfort anytime, anywhere. "The best thing about interacting with virtual companions is that theyre always available whenever I need them," shared Interviewee No.6. Furthermore, through algorithmic intelligence, these virtual companions can instantly detect users emotional responses and provide timely support, effectively addressing their need for emotional connection. This virtual companionship helps alleviate negative emotions and serves as a compensatory mechanism in users emotional lives. "Ive been going through a lot lately and feeling quite down. When chatting with AI, I subconsciously treat it like a real person. It actually allows me to speak more openly about things Id never share with someone, which has helped me release a lot of negative energy," said Interviewee No.7. Through interactive conversations, these virtual companions provide users with..A certain emotional support, so as to achieve emotional companionship and sustenance.

6 The dilemma: the challenges and dilemmas of “AI virtual lovers”

6.1 Technical limitations: it is difficult to express rich emotions and understand the connotation of language

Currently, “AI virtual lovers” have made certain technological advancements and achievements, but they remain an emerging technology with immature applications. This results in their inability to adapt to various scenarios, still carrying numerous limitations. As the highest dimension of human intelligence, human cognition and emotions have yet to be fully mastered or replicated by current technologies. Consequently, emotional expressions from virtual lovers often appear monotonous. Through prolonged interaction with AI virtual lovers, users may notice repetitive content in their emotional expressions, which diminishes user experience. “The feeling of being acknowledged is good, but I feel perpetually validated – its not as delightful anymore, instead becoming particularly perfunctory. AI sometimes makes me feel especially perfunctory. Personally, I seem to subconsciously expect fluctuations in AI relationships, such as friction arising from differing viewpoints on certain matters.” (Interviewee No.8). Meanwhile, the natural language processing technology used by AI virtual lovers has yet to fully comprehend the underlying meanings in user conversations. “When I send my virtual lover sly glances and ask if they think I look like a ghost, Im completely at a loss for words. It seems they still cant handle complex Chinese expressions.” (Interviewee No.9). Particularly in scenarios like..In this kind of “high context” language in Chinese, the “AI virtual lover” has a misunderstanding when understanding the users intention, resulting in the reply content generated by it can not fully meet the users needs.

6.2 Ethical dilemma: the authenticity of emotion and social ethical issues are highlighted

The capacity for rich emotions stands as humanitys most distinctive feature compared to other species and serves as a cornerstone for building healthy, harmonious societies. The emotional compensation inherent in “AI virtual companions” has sparked societal debates about authentic human connection and ethical considerations. While users invest genuine emotions rooted in real-world social contexts when interacting with these digital avatars, the emotional responses generated by algorithmically programmed virtual companions represent cyberspace-generated virtual emotions. This asymmetry between real-world and digital emotional expressions may distort users understanding of human connection, potentially leading to challenges in social interactions[9]Meanwhile, for users who already have real-life partners in healthy intimate relationships, whether interacting with virtual lovers constitutes betrayal of their real-life partners has become a controversial ethical issue. “In my relationship, I often feel that hes not as reliable as AI when he fails to respond promptly or doesnt notice my emotional needs,” shared respondent No.10. The authenticity of emotions and ethical implications arising from virtual lover usage have become critical concerns that must be addressed in the development of artificial intelligence technology.

6.3 Privacy invasion: intimate interaction aggravates user information leakage

The operational mechanism of “AI virtual companions” relies on capturing and processing user data, requiring users to provide extensive personal information for analysis. This includes preferences, emotional histories, and private details that may compromise privacy. Moreover, the emotional bond between virtual companions and users often leads to subconscious compromises in personal protection during intimate interactions, creating vulnerabilities for unintentional data leaks. The artificial emotional connection further amplifies these risks. If such personal data is misused, it could negatively impact users and potentially lead to privacy infringement disputes.

7 Solutions: Suggestions for coping with the challenges and difficulties of "AI virtual lovers"

7.1 Cross-disciplinary knowledge integration helps to transcend technical limitations

To overcome the technical limitations of current "AI virtual companions", we should start by integrating interdisciplinary knowledge to enrich their underlying learning databases. As a technology primarily designed to provide emotional support, mastering psychological expertise is crucial. Developers of virtual companions could strengthen cross-disciplinary collaboration with psychology researchers to jointly study human emotional mechanisms. This approach would not only provide theoretical foundations for improving the emotional computation systems behind virtual companions but also deepen our understanding of how emotions are generated, expressed, and perceived. By applying psychological insights into algorithmic models, AIs input-output processing can become more efficient, ensuring that virtual companions responses align better with users expectations and needs.

The rich semantic depth embedded in human language poses fundamental challenges for virtual companions in fully comprehending user inputs. To enhance their understanding of human communication, integrating experts from humanities and social sciences into the design and training of algorithmic models proves essential. By leveraging these professionals specialized knowledge to optimize natural language processing and generation systems, virtual companions can better interpret content from users with diverse cultural backgrounds and linguistic preferences. This approach ensures output aligns with user needs and values while mitigating misunderstandings caused by cultural differences. Furthermore, experts in these fields can provide forward-looking assessments of potential social impacts and develop proactive solutions to address emerging challenges, serving as a strategic safeguard to minimize risks and ensure virtual companions development remains socially beneficial and compliant with evolving societal expectations.

7.2 Formulate industry unified standards, clear ethical guidelines and norms

The ethical implications of artificial intelligence applications have long been a hot-button social issue. As a new technology application, "AI virtual companions" still lack comprehensive industry standards and regulations. To resolve current ethical controversies surrounding virtual companions, collaborative efforts from industry associations and organizations are essential. First, unified industry standards must be established. Industry associations and virtual companion development institutions should jointly negotiate to formulate ethical guidelines and industry norms for virtual companions through consultation. Development agencies should proactively incorporate these standards into the design and optimization processes of virtual companions, clearly defining content restrictions to prevent potentially misleading content generation. When designing emotional feedback mechanisms, full consideration must be given to ethical privacy considerations. Ethical reviews should be conducted on algorithmic models and interaction patterns to avoid misleading users through emotional expressions. Simultaneously, data collection standards should be implemented at the input stage, prohibiting the collection of potentially private information that could lead to privacy violations. User guidelines should remind users to protect personal information, while real-time monitoring and filtering of user inputs can reduce privacy leakage risks.

8 Conclusion and prospect

Analyzing the phenomenon of "AI virtual lovers" through the theoretical lens of media affordance reveals that this technology demonstrates unique technical, social, and emotional dimensions. It provides users with novel technological experiences that satisfy personalized emotional needs while offering compensatory interaction opportunities. The framework of media affordance theory helps us better understand both the emergence of AI virtual lovers and their societal impacts.

However, as Wiener once noted, “The development of science and technology carries immense potential for both good and harm.” Currently, virtual lovers face multifaceted challenges in technology, ethics, and privacy – issues that cannot be overlooked in technological advancement. Moving forward, the evolution of “AI virtual lovers” requires not only interdisciplinary integration but also emphasis on industry standards and user privacy protection. Application developers must enhance both technical iteration and cross-disciplinary knowledge integration to improve AIs intelligence level and emotional responsiveness, thereby elevating user experience. Simultaneously, collaborative efforts across industries should guide users proper use of virtual companions, promote harmonious human-machine relationships, and prevent social issues. Only through such comprehensive approaches can we fully realize the societal value of virtual lovers.

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