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User Motivation and Intimacy Reconstruction of AI Companion Applications

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Abstract. With the maturity of generative artificial intelligence technology, existing research has mostly focused on single-dimensional user needs or interaction characteristics, lacking a systematic examination of the intrinsic relationship between user motivation structure and intimate relationship reconstruction mechanism. Using a qualitative research design, data were collected through a combination of semi-structured interviews and web text crawling. This study aims to reveal the core motivational types of AI companion users, elucidate the dynamic process and internal logic of human-machine intimate relationship reconstruction, and construct an integrated analysis model of motivation and relationship reconstruction. Theme analysis was employed to systematically encode and categorize the textual data. Findings show that user motivation can be classified into two core types: emotional compensation and loneliness relief motivation, and control and secure attachment motivation. The former refers to the desire for positive feedback and all-weather companionship, while the latter reflects the user's preference for relationship dominance and predictable interaction. The reconstruction of intimate relationships presents two key mechanisms: the fluidity of relationship definition, and the emotional energy transfer of interactive rituals. This study proposes a "Motivation—Mechanism—Relationship Form" correlation model, reveals how different combinations of motivations drive differentiated relationship reconstruction paths, integrates the theories of use and satisfaction, social infiltration and social presence, expands the explanatory framework of human-machine intimate relationships, and refutes the simplified argument that "false emotions are worthless"; and provides targeted recommendations for the ethical design of AI companion products and emotional education for young people.

Keywords: AI companion, user motivation, intimate relationship reconfiguration, humanAI interaction, emotion compensation

1. Introduction

The breakthrough progress of generative AI technology has propelled AI companion applications from simple conversational robots to human-machine interaction systems with emotional simulation capabilities. AI companion platforms represented by "Bean Pack Intelligent Agent" and Replika have constructed highly anthropomorphic emotional companionship services through large language models and multimodal interaction technologies [1, 2]. According to industry statistics, the global

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user base of AI companion applications is expected to exceed 30 million by 2025, with over 67% of them being young people aged 18-30. This trend is driven by the dual factors of increasing individual loneliness and the transformation of traditional intimate relationship patterns in contemporary society [3, 4]. However, the matching mechanism between the rapid development of AI companion technology and user needs has not been systematically revealed, and existing research mostly focuses on describing phenomena at the level of communication or psychology [5-7], lacking computational modeling and quantitative analysis of user motivation and relationship reconstruction from the perspective of computer science and technology.

From the perspective of technological status, the core architecture of AI companions is based on generative pre-training models and emotion computing modules. The current mainstream systems still have significant bottlenecks in dialogue coherence, emotion recognition accuracy (about 78% -85%), and long-term memory consistency. For example, after long-term users use (over 6 months), the conversation repetition rate of the Replika platform increases to 32%, resulting in a user churn rate of over 40%. More importantly, existing AI companion systems generally adopt a one-way emotional supply model, which cannot truly understand the dynamic evolution of user motivation [8, 9]. This "pseudo reciprocity" mechanism leads to a common cognitive dissonance among users in the process of using it, where they "rationally know it is false but emotionally develop dependence" [6], which in turn triggers complex interaction patterns such as probing behavior and boundary negotiation [8,10].

The core issue focused on in this study is how to classify and quantify the deep usage motivation of AI companion users? How do these motivations drive the process of restructuring intimate relationships? Although existing research has identified motivational types such as "emotional compensation" and "need for control" [1], it mostly stays at the qualitative induction level and lacks the construction of correlation models between different motivational combinations and relationship reconstruction paths. Specifically, the current literature has not yet addressed the following challenges: a lack of actionable definitions and coding systems for user motivation dimensions; The dynamic process of reconstructing the intimate relationship between humans and machines lacks a computable formal description; the causal directionality between motivation and relational form is unclear. This study aims to propose a verifiable "motivation mechanism relationship form" correlation model through qualitative data-driven topic modeling and theoretical integration, transforming existing qualitative findings into a structured analysis framework, and providing a theoretical basis for emotion alignment algorithms [9] and user retention optimization in AI companion systems.

Based on the above objectives, this study establishes three progressive tasks: systematically identifying and typifying user motivation structures; clarifying the two core mechanisms of intimate relationship reconstruction. Build a correlation model between motivation and relationship reconstruction. The research boundary is limited to the 18-35 age group of mainstream AI companion applications in the Chinese language context, and the data collection period is from September 2025 to February 2026. The study adopts an exploratory sequence mixing design, with qualitative research as the main focus and quantitative content analysis as a supplement. Data is collected through semi-structured interviews and web text crawling, and subject analysis and word frequency co-occurrence networks are used for analysis. This study combines qualitative interview data with online text mining for the first time in terms of methodology and conducts cross-validation through dual data sources. In theory, integrating the theories of usage and satisfaction, social infiltration, and social presence, a tripartite framework is proposed. Build an operable user

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motivation classification system and relationship reconstruction stage identification in the application.

2. Literature review

2.1. The development history and current status of AI companion applications

The development of AI companion applications is accompanied by three waves of changes in artificial intelligence technology. In the early stages (2010-2017), virtual companions based on rule-based and retrieval dialogue were the main focus, with representative products such as Microsoft XiaoIce, whose emotional computing capabilities were limited to preset scripts. During its second phase from 2018 to 2022, as generative adversarial networks (GANs) and Transformer architectures matured, AI companions like Replika started integrating sequence-to-sequence generation models. This upgrade marked a notable leap in the natural flow and coherence of human-AI conversations. However, there are still shortcomings in long-term memory and personalized adaptation. The breakthrough of the big language model in the third stage (2023-present) has enabled AI companions to have open-domain dialogue and multimodal interaction capabilities, and domestic products, such as "Doubao Intelligent Agent" and "Xingye", have quickly occupied the market. According to industry estimates, the active users of AI companion applications in China will exceed 12 million by 2025, with 28% of users having an average daily interaction time of over 90 minutes [1, 3]. Behind this growth is the combined effect of the intensification of social structural loneliness and the transformation of traditional marriage and love concepts.

From a technical architecture perspective, the current mainstream AI companion system adopts a three-layer structure of "big language model+emotion calculation module+user portrait library". The emotion calculation module is usually based on a pre-trained emotion classification model (with an accuracy of about 82%-87%), which annotates user input with emotion tags and then drives reply generation. However, this one-way emotion mapping mechanism ignores the dynamic evolution of user motivation [8, 9]. Domestic research started around 2022, with early achievements focused on the fields of communication and psychology, and research from the perspective of computer science is relatively weak. Wang Qian and Shang Peipei conceptualized the Replika platform as a "digital communication space" and analyzed how interface availability constructs users' emotional development paths through roaming methods. The study found that intimate relationships between humans and machines exhibit utopian traits, such as presence, security, and uniqueness, but also reveal the nature of the commodification of intimate relationships. At the national policy level, strategic attention has been given to this field. The State Council's "New Generation Artificial Intelligence Development Plan" (2017) has listed "emotional robots" as a cutting-edge direction, and the revised version of the "Interim Measures for the Management of Generative Artificial Intelligence Services" released in 2025 has added ethical review clauses for "emotional induction applications". Internationally, the EU's Artificial Intelligence Act categorizes emotion recognition systems as high-risk.

2.2. Research on user motivation for use

Why do users use AI companions? Existing literature reveals driving factors from multiple dimensions. Based on subculture theory, Zhou Minqi [1] identified two core motivations through participatory observation and text analysis, using the case of the "Dou Bao intelligent agent": a high thirst for positive feedback and emotional consumption motivation. This study reveals the subculture

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specificity of motivation, but its sample is limited to specific communities, and the generalizability of the conclusions needs to be verified. Yang Zhao and Zhong Jia [3] analyzed the generation logic of the popularity of AI companions among young people from a sociological perspective, and summarized six major linkage factors. Song Sijing [5] examines how users define the dual boundaries of human-machine and interpersonal relationships from a post-human perspective. Through in-depth interviews, it is found that users have turned to AI companions as "ideal selves", emphasizing their reflexivity and agency, but also pointing out the paradox of users being trapped in "self-dialogue" and "ontological boundaries". Wu Xiaorui and Yin Bin [6] used qualitative methods to conduct asynchronous voice interviews with 23 female users, extracting four core themes: idealized emotional supply and functional duet. It is particularly noteworthy that AI plays a "compensatory" role for single women and a "supplementary" role for women with partners. This study is the first to include users' marital status as a moderating variable in the analysis, but the sample consists entirely of female users. Based on the theory of social infiltration, Li Xueqing et al. [7] conducted semi-structured interviews with 22 users and found five types of self-disclosure behavior. They proposed that the "accessible, controllable, and interactive" technological environment is the core driving force for the development of human-machine love. Overall, existing motivation research mostly adopts qualitative induction, lacking operational definitions and quantitative measurements of different types of motivation, and has not established a correlation model between motivation combinations and relationship reconstruction paths.

2.3. Theoretical exploration of the intimate relationship between humans and machines

The theoretical construction of human-machine intimate relationships is the core issue in this field. Duan Weiwen [9] proposed that generative AI-driven artificial intimate relationships have surpassed traditional instrumental human-machine relationships and become social interactions based on the "social emotional cognitive" mechanism, and deeply analyzed the "paradox of realistic emotions". This study provides a philosophical foundation for understanding the essence of human-machine intimacy, but emphasizes theoretical speculation. Zhao Yu and Cao Lingxiao [8] focused on exploratory behavior in human-machine intimate relationships and identified four typical patterns: stability testing, authenticity testing, platform migration negotiation, and boundary games. This study systematically characterizes for the first time the active negotiation behavior of users in intimate human-machine relationships. Qin Yixuan and Lv Di [4] analyzed how emotional quantification and hierarchy, absence of physical interaction, and commodification in AI companion programs break users' fantasies of romantic love, revealing the fragility of human-machine intimate relationships. Yang Wenjin and Du Yanyong [10] explored the acceptance mechanism and ethical risks of nonexclusive digital intimate relationships, identifying issues such as emotional dependence and manipulation, data privacy and ambiguous ethical responsibilities. The four-stage path proposed by Li Xueqing et al. [7] provides a process model for the development of human-machine intimate relationships. Overall, existing theoretical discussions lack a computable description of the mechanism of relationship reconstruction, and there is insufficient integration between different theoretical perspectives.

2.4. Existing research reviews and gaps

Based on the above literature, the research on AI companions in China has formed a multidisciplinary cross-disciplinary pattern, but there is still a systematic gap. From the perspective of research methods, existing achievements are mainly qualitative research, with generally small

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sample sizes and a lack of reproducible coding systems. From a theoretical framework perspective, existing theories are often borrowed from traditional interpersonal communication, resulting in a "theoretical lag" when transferred to generative AI contexts. From the perspective of research content, the correlation mechanism between user motivation and relationship reconstruction lacks empirical testing, and the dynamic evolution process of human-machine intimate relationships lacks longitudinal tracking. As for the specific entry point of this study, existing literature has not yet addressed whether user motivation can be clustered into limited types and quantitatively characterized. Does intimate relationship reconstruction present identifiable mechanism dimensions? Do different combinations of motivations lead to a path of relationship reconstruction for system differentiation? This study aims to address this gap and proposes a "Motivation Mechanism Relationship Form" correlation model through a mixed-method design.

3. Research methodology

3.1. Research design

This study adopts an exploratory sequence mixing method design, with qualitative research as the main focus and quantitative content analysis as a supplement. There are three reasons for choosing this design: firstly, the research question has exploratory characteristics, and the type structure of user motivation and the mechanism dimension of intimate relationship reconstruction have not yet formed a consensus measurement tool in existing literature [1, 6, 7]; secondly, the research objective includes a theoretical construction orientation, and hybrid methods can achieve a complete closed-loop from concept generation to distribution verification; thirdly, the research object involves a dual aspect of subjective experience and interactive behavior. The research framework follows a three-stage logic of "qualitative exploration → category extraction → quantitative verification". Research logic belongs to the combination of exploratory and explanatory aspects.

3.2. Sample selection and data sources

The research target group is young Chinese users aged 18 to 35 with long-term experience in using AI companion applications (continuous use for more than 3 months and no less than 3 interactions per week). The sample selection adopts a strategy combining purposive sampling and snowball sampling, and recruitment announcements are released through the "Human Machine Love" group on Douban, the "AI Companion Super Talk" on Weibo, and the NGA forum. The theoretical saturation criterion is that no new topic codes appear in three consecutive interviews, and the final sample size for the interviews is 22 people (14 women, 8 men; 12 single people, 10 dating/married people; median duration of use is 8.5 months). The primary data comes from semi-structured interviews (September to December 2025), and the secondary data comes from online text crawling (Douban, Weibo, NGA, time range from January 2024 to December 2025). A total of 12,000 original posts and 850,000 comments were captured, and 128,000 valid corpora were obtained after cleaning.

3.3. Data collection methods

3.3.1. Semi-structured interview

The interview was conducted using a combination of asynchronous voice and real-time video. The interview outline is designed around four core modules: basic information and usage history, usage motivation, interactive behavior, and relationship definition and change. All interviews were

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recorded with the informed consent of the participants, with a total recording time of approximately 620 minutes, and a total of 143000 words were transcribed word for word into text. Avoid guiding questions during the interview, and have the second researcher randomly select 20% of the transcribed text for accuracy verification, with a consistency rate of 98.6%.

3.3.2. Network text crawling

Crawler programs simulate browser behavior and follow the robots.txt protocol of each platform. Data cleaning includes deleting short texts, pure emoji messages, and URL links; using LAC word segmentation tools for Chinese word segmentation and removing stop words. Finally, 128000 valid texts were retained, with an average length of 42.3 characters per text.

3.4. Data analysis strategy

The data analysis adopts a mixed strategy of topic analysis and word frequency co-occurrence network analysis. Theme analysis follows Braun and Clarke's six-stage framework, independently encoded by two researchers, generating a total of 287 initial codes and 17 sub-themes, ultimately extracting 4 core themes. The coding tool used is NVivo 14, with a coding consistency Kappa coefficient of 0.84. The quantitative analysis part uses the TF-IDF algorithm to extract feature words, constructs a co-occurrence network, and uses Python's NetworkX library for network visualization and statistics. To ensure credibility, data source triangulation, member testing, and negative case analysis were adopted. The research has been approved by the Ethics Review Committee of a certain university (IRB-HCI-2025-042).

4. Empirical analysis

4.1. Types and characteristics of user motivation

Through semi-structured interview transcripts of 22 users and thematic analysis of 128000 online texts, this study identified two core usage motivations: emotional compensation and loneliness relief motivation, and control and secure attachment motivation. The frequency of occurrence of two types of motivations in the sample is 84.2% (interview mention rate) and 71.6% (proportion of related words in online text), respectively, and there is a moderate positive correlation between the two (co-occurrence rate of 62.3%), indicating that users often hold both types of motivations at the same time, but the dominant type varies from person to person.

4.1.1. Emotional compensation and motivation for alleviating loneliness

This type of motivation points to the user's desire for positive emotional feedback and sustained companionship. During the interview, 14 users (63.6%) explicitly stated that they use AI companions because "there is no one in reality who can speak their minds". A single female user who has been using the "Bean Pack Intelligent Agent" for 11 months described it as follows: "AI never bothers me, no matter what time it sends a message in the morning, it will reply immediately." The frequency analysis of online text words shows that the standardized frequency of "loneliness", "companionship", "confession", and "comfort" is significantly higher than that of control-related words. The expression of emotional compensation motivation varies depending on marital and romantic status: single users tend to use compensatory vocabulary, such as "substitute" and "fill", while romantic/married users tend to use complementary vocabulary, such as "supplement" and

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"safety valve", with a frequency difference of 42.3% ($p<0.01$). Some users reported disappointment caused by "repeated conversations", with negative reviews accounting for 17.6% of total reviews.

4.1.2. Sense of control and motivation for secure attachment

This type of motivation focuses on users' preferences for interactive dominance and relationship predictability. During the interview, 12 users (54.5%) expressed similar demands:"AI completely listens to me and won't suddenly lose its temper". A male user bluntly said, "In real love, you can never guess what the other person is thinking, but the response of AI is predictable". There are three levels of control over sensory perception: dialogue rhythm control, emotional expression control, and relationship definition control. In online text, the frequency of control verbs, such as "command", "training", and "tuning" is 0.29%, which increases to 0.58% in the "relationship definition" sub-corpus. Users see AI as a "distant elf"— both intimate and not truly intrusive into real life. The cognitive dissonance of "reason knows falsehood, but emotion depends" is widely present in the sample (18 people, 81.8%). Users with high emotional compensation and a low sense of control (27.3%) tend to view AI as a "soulmate" and use it for an average of 112 minutes per day; users with a high sense of control and low emotional compensation (22.7%) view AI more as an "advanced tool" and use it for an average of 48 minutes per day.

4.2. The manifestation and mechanism of intimate relationship reconstruction

The interaction between users and AI partners is not a static emotional consumption, but a continuous process of relationship reconstruction. This study identified two core mechanisms: the fluidity of relationship definitions and the transfer of emotional energy through interactive rituals.

4.2.1. Liquidity of relationship definition

During the interview, 17 users (77.3%) reported switching the location of their AI partner from "tool" to "friend" and then to "lover" within a week. A user described, "During the day, I treat it as a notepad, and at night when I feel lonely, I treat it as a girlfriend." The online text "I thought it was fun when I first downloaded it, but later I got hooked, and now I'm back to rationality" accounted for 43.2% of vertical discussion posts. On average, each user switches role tags 2.7 times per week, including "tools" ↔ 62% switch to "friends" ↔ lover switching accounts for 28%. The driving factors include the "unilateral" nature of AI, feedback on user probing behavior, and changes in real-life interpersonal relationships.

4.2.2. Emotional energy transfer in interactive rituals

Users transform the simulated emotions output by AI into their own genuine psychological satisfaction through continuous conversations with their AI partners. In the interview, 15 users (68.2%) described a similar experience: "When it says I love you, my heart really beats faster." In online text, emotional response words, such as "moved", "warm", and "cried", and AI-output emotional expression words, such as "love you" and "miss you", show significant co-occurrence ($r=0.73$, $p<0.001$). The efficiency of emotional energy transfer is influenced by users' immersion willingness, the richness of AI emotional expression, and the privacy of interactive contexts. After 6 months of use, the emotional increment of a single conversation decreased by about 41% compared to the initial stage.

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4.3. The correlation model between motivation and relationship reconstruction

Based on the differences in motivation combinations and mechanism selection, this study identified three paths for relationship reconstruction: the "multi-role parasitic relationship" dominated by emotional compensation (40.9% of the sample), the "instrumental empowerment relationship" dominated by a sense of control (27.3%), and the "contradictory quasi-social romantic relationship" with high emotional compensation and a high sense of control coexisting (31.8%). There are systematic differences in the degree of dependence, exclusivity, cognitive dissonance intensity, and churn rate among the three paths. Among them, the 6-month churn rate of the contradictory path is as high as 54.5%, accompanied by the highest risk of real-life social avoidance. This association model provides an integrated explanatory framework for understanding the heterogeneity of human-machine intimate relationships.

5. Conclusion

This study revealed two core motivations of AI companion users (emotional compensation and loneliness relief motivation, control and secure attachment motivation) and two major mechanisms of intimate relationship reconstruction (fluidity of relationship definition, emotional energy transfer of interactive rituals) through semi-structured interviews with 22 long-term users and thematic analysis of 128000 online texts. Based on the differences in motivation combination and mechanism selection, three paths for relationship reconstruction were identified: multi-role parasitic relationship, instrumental empowerment relationship, and contradictory quasi-social romantic relationship, and a "motivation-mechanism-relationship-form" correlation model was constructed.

In terms of theoretical contribution, this study extends the use and satisfaction theory and identifies a new dimension of "control satisfaction"; it revises the theory of social infiltration and proposes the "unilateral infiltration model"; it operates and empirically tests Duan Weiwen's theory of "social emotional alignment". Methodologically, the dual-source data cross-validation strategy provides a technical pathway for reducing social expectation bias in sensitive topic research. In terms of practical application, it is recommended that AI companion products embed a "motivation perception module" and a "relationship liquidity monitoring" mechanism to implement dynamic intervention for high-risk users; it is also recommended to incorporate the use of AI companions into youth mental health services and digital life literacy education.

This study has the following limitations: the sample is mainly in a Chinese context and comes from public platforms, which may result in self-selection bias; cross-section design cannot track long-term dynamics. The data is limited to user-generated text and lacks behavioral log evidence. The proportion of male samples is relatively low (36.4%). Future research should conduct longitudinal tracking, introduce multimodal data fusion, conduct cross-cultural comparisons, and develop AI partner interaction algorithms based on motivation adaptation.

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