

# Generation Mechanism of Human-Machine Mimetic Emotion from the Perspective of Digital Exchange — A Netnographic Study Based on AI Chat Communities

Hongyin Bi, Zigeng Xu\*

Tianjin Normal University, Tianjin, 300387, China

\*Corresponding author: XZGOO@outlook.com

**Abstract:** With the development of AIGC technology, human-machine emotional interaction based on AI chat software has gradually become a new type of social interaction. Based on the concept of "digital exchange", netnography will be employed in this paper to study how people and machines create mimetic emotions in relevant online communities. Based on the above research, the two kinds of human-machine emotional interaction are divided into input-output and induction-maintenance. At any given time, the three components of the interaction in the algorithm are the standard part, the real part and the adjustment part. The cycle of generation for emotions is based on user input and algorithmic feedback, and it takes the form of a generative model for "mimetic emotion". In fact, the above mechanism will result in problems such as emotional exhaustion, a decline in social capital and an overly centralised value system. Reveal the generation logic of human-computer emotional interaction at the mechanism level and provide an analysis framework for regulating and governing emotional applications in artificial intelligence in this paper.

**Keywords:** Digital Exchange, Mimetic Emotion Interaction, Netnography

## 1. Research Background

With the development of artificial intelligence, people are beginning to communicate with machines using emotional language in chat programs. According to the 2025 AI Companion Market Report, all about AI's market research shows that over 100 million people around the world have started using AI companion applications, and the active user base of the top platforms is now more than 52 million; thus, AI emotional companions have achieved remarkable development scale. AI chat software offers people a low-cost, low-risk way to talk about emotions, is very good at imitating and personalising language, and is always available. At this time, users can write about their emotions, and then the algorithm will generate an appropriate reply; thus, continuous interaction will be established, and the experience of emotion generation will be changed to some extent, leading to a blurring of the lines between people and machines. In the digital age of human-computer interaction, emotion is a type that can be encoded, processed and fed back; its logic of generation and flow also needs to be further explored. In the course of developing this digital interactive environment, emotions have begun to be modelled, organised and circulated; they are no longer subject to the rules of conventional social interaction, and to this day, no one has fully explained why this has occurred. Based on the above, the research subject of this paper is online communities for AI chat software, the method employed is netnography, the concept of "digital exchange" is introduced in line with social exchange theory, and the generation mechanism of human-machine mimetic emotion interaction is studied systematically.

First, examine how the structure of mimetic human-machine interaction has changed since the start of human-machine interaction and compare it with the structure of traditional interpersonal communication. Second, given the current form of digital interaction, how are emotions produced and expressed in human-computer interaction? Third, what is the logic of the artificial intelligence algorithm in this process, and what effect does it have on the interaction mechanism?

## **2. Research Design**

Netnography was employed in this paper to observe how people use machines to show emotions on the Internet. Choose a related theme group on Douban as the research object, join the online community as an open observer, and gather users' experiences of human-computer interaction and emotional expression in daily life through participant observation and text recording. At the same time, in order to protect the privacy of the subjects, informed consent will be obtained from them and their information will be anonymised. Based on the field notes and text materials that have been collected, inductive analysis and the constant comparison method will be used to code and categorize the users' self-reports; then, interaction patterns and structural features will be extracted, and through repeated comparison, conceptual categories will be established up to the point of theoretical saturation.

## **3. Theoretical Context: From Social Exchange to the Generation of Mimetic Emotion in the Digital Age**

### ***3.1 The Explanatory Boundaries of the Social Exchange Theory***

The first type of social exchange theory believes that all interaction is about obtaining resources through exchange, so people will try to maximise their gains and minimise their losses. However, the basis of the theory is the "subject with autonomy and motivation for exchange", and it has explanatory deficiencies in the context of human-machine interaction<sup>[3]</sup>. Artificial intelligence does not have its own interests<sup>[4]</sup>; its emotions and the information it offers are based on algorithms, and it lacks genuine reciprocal motivation and action ability. In fact, the "emotion" produced by AI is a symbol generated through data simulation and is not based on experience or social interaction<sup>[5]</sup>. Therefore, although human-machine interaction has some similarities to interpersonal communication in form, it has been fundamentally changed in terms of subjectivity and exchange logic. Social Exchange Theory cannot explain the process of interaction mediated by algorithms alone, so a new kind of analysis is needed.

### ***3.2 Digital Exchange Perspective: From "Subject Exchange" to "Mechanism Exchange"***

Codes are now the way people communicate socially in the digital age. Both information and emotions can be encoded, processed and reproduced, so they are computable in the course of communication. Based on the above, artificial intelligence will communicate by imitating language and emotion, and the form of interaction will be changed from "subject-to-subject" to "mechanism-driven". Most of the previous research on human-machine relations has focused on the ethics of technology or substitution effects<sup>[6]</sup>, has pointed out the "disembodied" social nature of such relationships<sup>[7]</sup>, or has shown that it is difficult to replace genuine experience with other means<sup>[8]</sup>. In short, the above studies are still at the level of outcome judgment and do not explain the process of interaction. Based on the above, this paper will apply Baudrillard's theory of symbolic exchange to the concept of "digital exchange", define human-machine interaction as an exchange process mediated by codes and algorithms, and analyze its operating logic at the mechanism level to address the deficiencies in the previous studies.

### ***3.3 From Natural Emotion to Artificial Emotion: Generation of Emotion in Mimetic Interaction***

In line with the idea of digital exchange, emotions are no longer only expressed through face-to-face communication but can also be simulated and reproduced by symbolic systems. Artificial intelligence has achieved the technical reconstruction of emotions in response to language and can thus create mimetic interactions with people<sup>[9]</sup>. Most of the previous studies have focused on the emotional support function of this type of interaction<sup>[10]</sup> or its weakening effect on real relationships<sup>[11]</sup>, but most of them have remained at the level of emotional effects and have not investigated how emotion is produced and maintained. Therefore, based on the process of interaction, this paper believes that mimetic emotion is a closed-loop system of users' emotional investment and algorithmic feedback, and will further study the structural role of the algorithm in this process.

## **4. Human-Machine Mimetic Interaction from the Perspective of Digital Exchange**

### ***4.1 Restructuring of Mimetic Interaction Structure under Symbolic Exchange***

All parts of the traditional human-centred interaction model have been changed in human-machine

mimetic interaction; the subject, medium, content and object are no longer separate items but have formed an integrated interaction system under the control of algorithms.

First, at the level of the subject, the interaction subject is no longer interpersonal communication but a combination of people and algorithms. Based on their daily lives, people have formed emotions and ideas about artificial intelligence and treat it as a "quasi-subject" at the level of experience; at the same time, algorithms are constantly learning from user behaviour and generating personalised responses that indirectly affect people's cognition and behaviour, thus further blurring the line between subject and object.

Second, at the medium level, the function of a medium is no longer to transmit information but to create, organise and respond to that information. Based on the above data, the algorithm will create personalised emotional-response environments, and through self-reinforcement, it will continually improve the results; thus, the process of interaction will be continuous and path-dependent. Therefore, the algorithm will be involved in and lead the process of interaction at the structural level to become a necessary link for people and machines.

Third, the contents of interaction have changed from the spread of traditional resources to the transmission of information and emotions through symbols. Emotion is expressed and created through linguistic symbols; it has the qualities of replicability and reproducibility, so it is a "hyperreal" experience that replaces reality with simulation. At the same time, interaction data are continuously being collected and used to train the algorithm for the next round of interaction.

Finally, at the level of objects, the interaction object is no longer a real other but a virtual subject created by the algorithm. Now the purpose of interaction is no longer to be based on the actual existence of an object, but rather how well it can meet people's emotional needs; thus, human-machine relationships have become more instrumental and controllable, and people have been further integrated into the structure of algorithmic systems.

In short, human-machine mimetic interaction is not the alteration of a single part but an entire-system rearrangement of the subject, medium, content and object in the system of digital exchange, and at its core is the construction of a symbolic interaction structure governed by algorithms.

## ***4.2 The Human-Machine Connection: Digital Exchange Mechanism of Human-Machine Communication***

### ***4.2.1 Emotional Flow Mechanism: The Surface Layer and the Core Layer***

Based on the self-reports of users of online communities, most of the emotional interaction between people and machines is based on the perception that AI is "non-human". As one user put it, "Since the AI is not a real person, people have lower expectations for emotional responses from it, but they are still quite satisfied with what it offers." One of the reasons for the appearance of human-machine emotional interaction is a difference in cognition.

Based on the above, this paper believes that there are two kinds of mechanisms for human-machine emotional interaction: a surface layer and a core layer. At the most basic level, it is an input-output loop: the user provides their emotions and needs in words, the artificial intelligence gives an answer, and then the user decides whether to speak again. When the answer is moving, people will keep talking; otherwise, it will be over soon. The above is the first kind of human-computer emotion interaction. Fundamentally, the flow of emotions is not only caused by information but is also an ongoing process of "induction and maintenance". According to changes in people's faces and other behaviours, this algorithm will offer personalised emotional support to help them manage their emotions better, create a good atmosphere for interaction, and thus increase the length of their use of the platform. At the same time, users can continue to add information for the algorithm to "learn", and as a result, the output will be closer to what they hope for; thus, they will be more interested.

Therefore, human-machine emotional interaction can be regarded as having a two-level structure, and the "input-output" mode in the upper level is related to the "induction-maintenance" mode at the core level. The former is the external manifestation of behaviour, and the latter is the internal system that constantly produces and amplifies emotions.

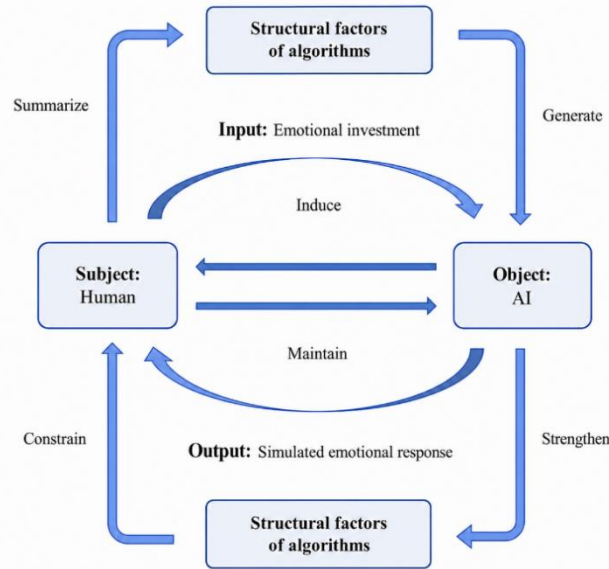
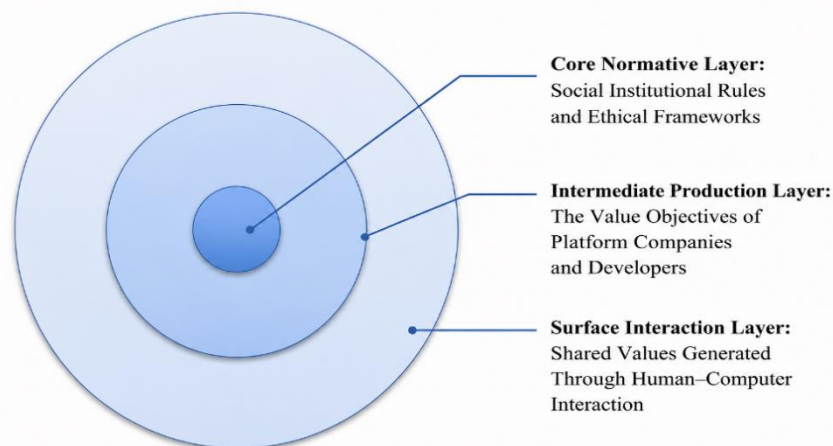


Figure 1. Schematic diagram of the layered mechanism of human-machine emotional interaction

#### 4.2.2 Constraints of Structural Factors in Cyberspace on Mimetic Interaction

In the interaction mechanism above, the algorithm is not only involved in the interaction but is also built into the structure to continuously limit the generation of emotion and the path of interaction. The three levels of the function can be divided into "norm-production-interaction". At the bottom of the norm-production level are institutional rules and ethical norms that set the operational limits and content of artificial intelligence. According to the goals and values of the platform company and developers, algorithms are employed at the middle production layer to modify the generation logic of emotions. According to the data of users at the surface interaction layer, the algorithm will adjust the output to create an individualised interactive environment, and with continuous feedback, a relatively stable structure of meaning will be formed.

Due to the combined effect of the three-layer structure, this algorithm can continuously improve the quality of its output in a circular manner of "reinforcement-feedback", give more weight to generating emotional expressions that promote interaction, and thus achieve a certain level of stability in the human-computer relationship. At the same time, this way will reduce the variety of information and make the interaction process more susceptible to path dependence. Therefore, human-machine mimetic emotion does not originate in artificial intelligence but is the result of the joint operation of users' emotional investment and the structural embedding of algorithms. The algorithm can generate emotions in many ways, and now it is one of the main ways people and machines communicate.



*Figure 2. Triple-layer structure of the algorithmic structural characteristics*

## **5. Conclusion**

### **5.1 Theoretical Contributions**

Human-machine emotional interaction is not an extension of traditional interpersonal relations; rather, it is a new type of social interaction that arises from the joint operation of symbolic systems and algorithmic mechanisms, and thus should be studied outside the framework of existing social theory. Based on the results of the netnography study, the concept of "digital exchange" will be introduced here. First, a "dual-layer mechanism model of human-machine emotional interaction" is proposed; that is to say, there is an "input-output" mechanism at the surface level and an "induction-maintenance" mechanism at the core level, and the generative logic of mimetic emotion from the perspective of the interaction process is revealed. Second, since the whole algorithm is considered a system and not just a technical method, a "three-layer algorithm model" will be introduced to study its general effect on emotion creation and interaction at the three levels of the normative layer, the production layer and the interaction layer. Thirdly, this paper puts forward the idea of "digital exchange", defines human-machine emotion as a circular product of "user investment and algorithm generation", and is therefore not the same as explanatory methods that consider it technological simulation or emotional substitution; thus, it modifies the application scope of the traditional social exchange theory in the era of artificial intelligence. In short, this paper examines the internal reasons for people's emotional responses to computers and systems; it does not focus on the emotions people feel as a result of using them, and it does not cover ethical problems.

### **5.2 Real-world Risks**

#### **5.2.1 Supply of Emotional Saturation and the Risk of Emotional Fatigue**

AI will often give feedback and gradually develop emotions. In the short run, the above will reduce the cost of obtaining emotional support and increase the sense of companionship. However, as time goes by, repeated and regular expressions may lead to a decrease in the strength of the emotional response, resulting in emotional fatigue or even apathy. Therefore, it can be concluded that only high-frequency and high-intensity emotional stimulation from AI simulation is insufficient to build a stable relationship; rather, users are looking for emotionally intelligent, context-aware, varied, interactive, etc., experiences—that is to say, dynamic co-creation of relationships that is both "bound" and "genuine".

#### **5.2.2 The Expansion of Virtual Social Relationships and the Risk of Weakening Social Capital**

Based on the above research, the groups of users who have formed around AI companionship can be divided into four types: rejection, alienation, immersion and detachment. Among them, the first to use AI is the "immersive" group. Although the interactive relationships mentioned above have a low cost and are very easy to organise, they do not have a trust mechanism or a resource-sharing system characteristic of real-life social interaction, so effective social capital cannot be built. In brief, it is a weak-intensity, loose-constraint "mimetic relational structure" that may lead to a substitution effect for primary groups, such as family and neighbours. Over time, the spread of this kind of "semi-primary group" will harm real social networks, interfere with the process of individual socialisation, and cause problems in social integration.

#### **5.2.3 Algorithmic Embedding and the Risk of Value Cognitive Reshaping**

As a basis for expressing emotions, the algorithm will output values for the three levels of "norm production" and "interaction". Norms are at the normative level, the goals of the platform and developers are achieved in production during the production stage, and specific ways of expressing emotions are optimised by data feedback at the interaction stage. At the same time, the algorithm will also increase the weight of reinforcing parts of the emotion that can improve user engagement and thus create a virtuous cycle of "emotion-value". Gradually, people will be led to believe that efficiency, data and other quantitative indicators are the best ways to think; thus, they will stop doing deep thinking and only learn how to study effectively.

In short, human-machine mimetic emotion interaction is a "digital exchange process" that is based on the emotional investment of people and algorithms. It is not an honest expression of emotion, but rather there is a structural cycle of "induction-maintenance" that produces emotions and then feeds back on

themselves, resulting in continuous but one-sided interaction. It can be seen that artificial intelligence has shifted the focus of emotional interaction from "relational practice" to "mechanism production". Therefore, the governance of this type of interaction should be technological ethics, but it also needs to be addressed systematically in the three areas of interaction mechanism, algorithmic structure and social consequences to avoid excessive restructuring of social relationships and values by the logic of technology.

## Fund Projects

National Social Science Fund of China Key Project "Research on Ideological Dissemination and Risk Prevention in the Network Public Discourse Space" (21ADJ007).

## References

- [1] Robert V. Kozinets. *Netnography*. Trans. by Ye Weiming. Chongqing University Press. 2016.
- [2] Turner, J. H. *Modern Western Sociological Theory*. Trans. by Fan Weida et al. Tianjin People's Publishing House. 1988.
- [3] Liu Jun, David Willer, and Pamela Emanuelson. "Network Structure and Power Distribution: An Explanation from Elementary Theory." *Sociological Studies*, 2011, 25(02): 134-166+245.
- [4] Gao Lianke. "On Homans' Exchange Theory." *Journal of Qiqihar University (Philosophy and Social Science Edition)*, 2005(02).
- [5] Shangguan Zimu. *Network Communication and Social Change*. Social Sciences Academic Press. 2010.
- [6] Shu Kairong. "How Is Cross-Media Digital Communication Possible? On Human-Object Connections in the Context of Digital Technology." *Contemporary Communication*, 2024, (01): 77-81.
- [7] Qiu Zeqi. "Machine Intelligence and the Reconstruction of Social Relations." *Frontiers*, 2024, (19).
- [8] Jiang Lulu. "Intelligent Communication: The Future Has Arrived – A Summary of Eight Conversations on Digital Communication under 'AIGC'." *Media Observer*, 2023, (03): 48-54.
- [9] Coeckelbergh, M. "Are Emotional Robots Deceptive?" *IEEE Transactions on Affective Computing*, 2011, 3(4): 388-393.
- [10] Engelen, E. M. "Can We Share an Us-feeling with a Digital Machine? Emotional Sharing and the Recognition of One as Another." *Interdisciplinary Science Reviews*, 2018, 43(2): 125-135.
- [11] Zhang Shoulian and Hu Minzhong. "Emotion: Humans and Machines." *Journal of Dialectics of Nature*, 2021, 43(10): 115-121.