

The Magic of Alchemy: Exploring the Human- Computer Interaction Practices of Generative Artificial Intelligence Enthusiasts from the Perspective of Philosophy of Technology

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Abstract

Building upon existing geek studies and grounded in the philosophy of technology, this paper explores the human-computer interaction practices of technical enthusiasts in the era of Generative AI through qualitative interviews. Artificial intelligence (AI) technology can be understood as a digital object undergoing a continuous process of individualization. While technical enthusiasts assemble technical elements, invent technical individuals, and deploy technical infrastructure, they also function as technical individuals themselves. Together with AI, they co-construct an associated milieu, developing discursive and existential relationships in both technical and material senses. Furthermore, technical enthusiasts are capable of mastering the causal logic and temporal relationships of AI systems. Through ready-to-hand engagement and iterative “alchemy” (fine-tuning/training), they drive the process of technical individuation forward. Drawing on the phenomenological circuits of protention and retention, AI technology serves as “tertiary protention” and “tertiary retention,” intervening in the individuation process at both psychic and collective levels; in this process, technical enthusiasts act as vital transducers (*transducteurs*). While AI technology can be a poison, it can also serve as a remedy. Although human-machine practices do not rule out the possibility of technical alienation, this paper emphasizes the potential of technical enthusiasts as “alchemists” and the “magical” capabilities possessed by humans, thereby highlighting the agency of the subject.

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Introduction

As an intervener, artificial intelligence (AI) exerts influence across all aspects of society (Ismail & Ahmad, 2025; Wu, 2020). Specifically concerning human-computer relations, the impact of AI on human subjectivity manifests primarily in two aspects. On one hand, AI empowers the human subject (Xiong et al., 2024). On the other hand, AI gives rise to a reign of new “the they” (Das Man) (Liu & Lian, 2023), rendering agency computable (Hu & Teng, 2025) and marginalizing humans (Wu, 2020). Thus, human subjectivity is effectively diminished.

Since the dialectical tension between AI-driven empowerment and the erosion of subjectivity is inherent to the technology, we must ask: Within the dynamics of human-computer relations, is it possible for humans to utilize AI in a way that fully realizes, rather than diminishes, their agency? Given their early exposure to generative AI and substantial interactive experience, technical enthusiasts¹ offer valuable empirical evidence to help address the core issues of this study. Although technical enthusiasts have received considerable attention in academia, relevant studies are often subsumed under the umbrella of fan studies, sharing deep connections with research on geek cultures in the digital age. However, the rise of generative AI introduces new topics for geek studies and invites a technical-philosophical perspective, while the philosophy of technology can, in turn, reinvigorate geek studies.

Drawing on the technological philosophies of Gilbert Simondon, Bernard Stiegler, and Yuk Hui, this paper focuses on the community of technical enthusiasts in the generative AI era, exploring human-computer interaction practices alongside the potential for subjective agency within technical practice.

Specifically, this paper pays attention to the “alchemy” (炼丹) of technical enthusiasts. What is “alchemy”? It refers to the training or fine-tuning of models. This process requires collaboration between the technical enthusiasts and the generative AI. Relying on the logic of AI systems, technical enthusiasts gather data, adjust parameters, and train models to suit their needs—or even develop entirely new generative AI software—crafting “elixirs” of technology. Consequently, through their continuous human-computer interactions, technical enthusiasts dissolve the boundaries between the amateur and the professional, manifesting the latent potential and transformative agency inherent in the contemporary era.

Literature Review

Fans Amidst Changing Technological Forms vs. the Connotation of Technical Fans

Since its inception, the term “fans” has carried negative connotations, often associated with notions of abnormality, madness, and fanaticism. However, building on the work of Michel de Certeau and John Fiske, Henry Jenkins’ *Textual Poachers* sought to reclaim fans from their negative stereotypes. Fans are no longer viewed as separate from ordinary people, nor are they dismissed as fanatics idolizing misguided figures or detached from reality. Instead, they are recognized as active creators and meaning producers (Jenkins, 2016, pp. 15, 22).

The development of fans and fandoms is closely linked to the evolution of media technologies, manifesting first through science fiction and radio subcultures before expanding into film,

television, and eventually, the digital sphere. In the mid-nineteenth century, toy printing presses empowered enthusiasts to produce newsletters through manual typesetting. These early publications are now recognized as the precursors to fanzines—a lineage exemplified by the magazines circulated within the science fiction community (Jenkins et al., 2017, pp. 18–19). Beyond printing, early science fiction fans often gravitated toward amateur radio—an engagement that positioned fandom as a leading example of participatory democracy by the 1960s. As screen media technologies evolved, they unlocked even broader possibilities for fans to engage in collective cultural production. Since the late twentieth century, digital technology has given rise to “digital fandom” (Booth, 2010, p. 117), in which fans act as both producers and consumers while forming online communities.

While fans have generally been early adopters of new media, technical enthusiasts constitute a distinct subgroup marked by a particular fervor for technology. Among the earliest pioneers in experimenting with digital and mobile technologies were so-called “geeks” (Jenkins et al., 2017, p. 183)—also known as technophiles, techno-enthusiasts, or *tech-otaku*. Coincidentally, the connotation of “geek” has undergone a transformation from negative to positive, much like that of “fans.” This semantic shift is evident across three historical stages. In the Printing Age, the concept was closely associated with “freaks” and “fools.” (Tian, 2015) By the Film and Television Age, it had become synonymous with “nerds” and “mad scientists.” (Salter, 2018) With the advent of the Internet Age, the term came to denote a group distinguished by a high degree of technical and computer proficiency (Li, 2024, p. 3). Consequently, the geek is no longer relegated to the margins of society; instead, the term has come to symbolize individuality and trend-consciousness. In this context, being a geek entails embracing a distinct lifestyle—one defined by self-selected behaviors and media habits that help construct a unique and personalized socio-cultural identity (Dong, 2011, p. 2). When anyone can identify as a geek, a “geek elite” often emerges as a driving force behind social and technological development, exemplified by figures such as Mark Zuckerberg and Bill Gates.

The Textual, Cultural and Social Dimensions of fan Studies and Geek Studies

Research led by Jenkins concentrates on fans’ textual productivity alongside their cultural and social influence. Jenkins focuses on film and television fandoms, examining how fans consume and produce media to weave disparate popular texts into a complex network of intertextuality (Jenkins, 2016, pp. 15, 39). With the advent of digital media, fans cultivate small-scale social networks predicated on reciprocity and creative production. Within these contexts, participants accrue the social capital and self-esteem necessary to navigate social constraints (Jenkins et al., 2017, pp. 2, 18). Beyond these social benefits, fans actively construct their cultural identities through engagement with diverse media and a wide range of texts. In doing so, they also generate political (Liu, 2017) and economic impacts (Cai, 2009, 2015).

Scholarship on geeks still leans heavily on Jenkins’ research approach. Building on Jenkins’ work and focusing on teen geeks, Ito (2009, p. 189) delineates the institutional practices and cultural discourses underlying media technologies. With a background in computer science, Boyd—acting as both an ethnographer and a geek—aligns with Crawford in emphasizing the role of technology as a tool that shapes the world. Together, Boyd and Crawford (2012) advocate for a critical examination of its capacity to influence society, particularly by questioning the assumptions, values, and biases embedded in big data research. Within the trajectory of fan studies, geek studies often foreground social and cultural dimensions. For example, scholarship suggests that the geek identity is typically coded as male, middle-class, and heterosexual (Ottemo et al., 2025).

Meanwhile, technological subcultures remain foundational to geek culture. Anime and otaku cultures, for instance, represent archetypal forms of geekdom, embodying a collective ethos grounded in the principles of “knowledge, play, and pleasure.” (Li, 2024, p. 275).

Implications of Algorithms and AI

With the advancement of technology, algorithms have entered the purview of fan studies. Fan behaviors have shifted from a focus on textual significance to an increasing obsession with data and algorithms (Wang & Chen, 2023). Embedded within the logic of capital, these algorithms reconfigure existing power dynamics and discourses, thereby shaping practices within fan communities (Yin, 2021). As a result, digital fans have become “datafied fans,” engaging in the systematic labor of protecting idols from online attacks (Zhang & Hu, 2021). Through practices such as curated commenting and reporting on platforms like Weibo, fans amplify favorable narratives while suppressing criticism. Weibo functions as a stage for the ritualized performance of fan support, while simultaneously quantifying and regulating fans’ emotional investments (Wang & Chen, 2023, 2024).

While the emergence of datafied fans and their data-driven practices aligns with Jenkins’ cultural studies trajectory, the rapid evolution of generative AI presents a profound challenge to traditional notions of human creativity and agency. This shift necessitates an expansion of fan studies, introducing novel dimensions for geek studies that account for the co-productive role of non-human agents. In response to these developments, Jenkins et al. (2023) emphasizes the agency of fans. From his perspective, while AI can generate formulaic content, it lacks the capacity for genuine creativity. Jenkins consistently maintains that outstanding fan creations remain firmly grounded in human creative praxis.

Nevertheless, the actualization of agency depends on a deep understanding of non-human agents; therefore, researchers must interrogate technical systems. Pioneering scholarship by Gilbert Simondon and others explores the “capillaries” of technology, arguing that, while technology functions as a tool, it also constitutes a distinct ontological object with an internal logic that demands systematic investigation.

Perspective of Philosophy of Technology

Scholars in the philosophy of technology, such as Gilbert Simondon, Bernard Stiegler, and Yuk Hui, have examined the mechanisms through which technical objects² function. Adopting an ontogenetic perspective, Simondon (2024, p. 6) delineates three distinct registers of technical objects: elements, individuals, and ensembles. Crucially, the genesis of technical objects is predicated on the dual processes of “individualization” and “individuation,” through which their evolution becomes inextricably entangled with external realities, such as culture and religion. Drawing on the work of Simondon and other philosophers, Bernard Stiegler foregrounds the question of temporality and memory by positioning technical objects at the center of his concept of “tertiary retention.” Functioning as the material foundation of the objective world, tertiary retention constitutes the very milieu in which the subject is situated and through which it is shaped at the phenomenological level. Put simply, for Stiegler, technical objects embody human “default” (lack) and prosthetic extension, linked to the exteriorization of memory and shaping processes of individuation at both psychic and collective levels. This externalization of memory finds its quintessential expression in photography. With the advent of computer technology, a new “epiphylogenetic era” emerges, marked by the rise of digital tertiary retention (Stiegler, 2012, pp. 80, 186).

Acknowledging the complexities of this digital shift, Yuk Hui builds upon Simondon's genetic study of technical objects and introduces the notion of "tertiary protention," aligning it with tertiary retention to address the logical tension in Stiegler's framework. Yuk Hui (2020, p. 304) emphasizes the capacity for machine anticipation, positing it as "tertiary protention," and further argues that technical systems are inherently organic. In his analysis of digital objects, he defines the "digital" as pertaining specifically to the automation of data processing. Data and metadata embody the objects with which subjects interact and with which machines simultaneously operate (Hui, 2018, p. 42). Through the dual movement of the objectification of data and the datafication of objects, data becomes an integral component of human experience. This process of data objectification corresponds to Simondon's notion of technical individualization, constituting a primarily discursive relationship. Concurrently, Hui privileges the individuation of digital objects, foregrounding a temporal dynamic and the interplay among digital objects, users, and the "associated milieu," while also giving rise to mnemonic functions (Hui, 2018, pp. 35, 50, 115).

In essence, the philosophical lineage spanning Simondon, Stiegler, and Hui offers an organological genealogy of technical objects, tracing the shifts in individualization and individuation from the mechanical to the algorithmic. However, while they tend to emphasize cooperation between humans and machines, this emphasis often risks undermining subjective agency. In this regard, Yibing Zhang (2018, p. 80) critiques Stiegler for a persistent emphasis on the material retention of technical objects at the expense of human agency. From Zhang's standpoint, the ontological value of a technical object is realized only through its praxis—its practical application. He argues that the true foundation of technical systems lies in the human's capacity to "situate" the object within a social context; it is this active and intentional placement thus warrants theoretical priority over the technical object itself.

Conversely, geek-related research typically privileges the cultural and social dimensions of human-machine interaction, a focus that often overstates subjective agency to the point of eliding the ontological existence of the technical object itself. It is essential for humans to develop a mode of coexistence with technical objects that entails mastering their internal operational logic while safeguarding their subjective agency. In this regard, the human-computer interactions practiced by technical enthusiasts serve as a vital empirical reference. By integrating the philosophy of technology with fan studies, this research examines the dual logic of individualization and individuation inherent in generative AI, alongside the processes through which technical enthusiasts actively appropriate these technical systems into their daily practices. In doing so, these practitioners actively carve out spaces for subjective agency, ultimately co-constituting a distinct technological and cultural world.

Research Design

Employing a qualitative framework that combines netnography and semi-structured interviews, this study offers an in-depth analysis of the human-computer interaction (HCI) practices characteristic of Artificial Intelligence Generated Content (AIGC) enthusiasts. These individuals are familiar with relevant AIGC software, frequently use these tools for creative production, and possess a certain level of technical knowledge. Notably, this study includes participants working in algorithmic professions, providing insights from those directly involved in the research, development, and architectural design of generative AI systems.

Spanning May 2023 to December 2024, this study engaged multiple generative AI technical exchange communities via Bilibili and other online platforms. The research involved observing members' use of relevant software—including Stable Diffusion, MarsCode, and RVC—as well as the content they shared. Semi-structured online interviews were conducted with core contributors via text and voice. To develop a "thick description" of the dynamic interplay between technical enthusiasts and

Table 1. Respondent Profiles.

Code	Gender	Occupation	Education	Chat Format	Contact Duration (As of Interview)	Age	Province/ Background
M1	Male	Technology Practitioner	Master's	Text	6 months	30	Shanghai/urban
M2	Male	Financial Practitioner	Master's	Voice	1.5 years	28	Shanghai/urban
M3	Male	Algorithm Engineer	Master's	Text	1.5 years	29	Shanghai/urban
M4	Male	Business owner	High School Dropout	Text	3 months	33	Unknown/ rural
M5	Female	Student	Bachelor's	Text	1 month	20	Guangdong/ Unknown
M6	Female	Student	Bachelor's	Text	1 month	22	Guangdong/ Unknown
M7	Male	Freelance Entrepreneur	Bachelor's	Voice	1 month	34	Shaanxi/rural
M8	Male	Technology Practitioner	Doctorate	Voice	1.5 years	28	Hubei/rural
M9	Female	Student	Doctorate	Voice	1.5 years	28	Henan/urban
M10	Female	Student	Master's	Voice	1.5 years	28	Hubei/urban
M11	Male	Student	Master's	Voice	1.5 years	24	Beijing/urban
M12	Female	Student	Doctorate	Voice	1.5 years	27	Jiangxi/rural
M13	Male	Student	Bachelor's	Text	2 months	25	Henan/ unknown
M14	Male	Civil Servant	Bachelor's	Voice	1.5 years	26	Yunnan/rural
M15	Male	Researcher	Doctorate	Voice	1 year	34	Henan/rural
M16	Female	Freelancer	Master's	Voice	1.5 years	33	Unknown/ rural
M17	Male	Algorithm Engineer	Master's	Voice	1.5 years	30	Beijing/ unknown
M18	Male	Algorithm Engineer	Doctorate	Voice	1.5 years	31	Beijing/rural
M19	Male	Algorithm Engineer	Master's	Text	1 month	29	Guangdong/ rural
M20	Female	Student	Bachelor's	Voice	2 months	23	Hubei/rural

AI, snowball sampling was employed to recruit technically proficient participants. For those who consented to voice interviews, sessions were recorded and subsequently transcribed. Interviews averaged approximately 30 min, with some extending up to three hours.

In addition, the researcher engaged directly with relevant software and participated in an offline technical workshop in November 2024, operating generative AI systems and interacting with organizers. The demographic and professional profiles of the interviewees are presented in the Table 1 below:

The Agency and Potential of Technical Enthusiasts’ Practices

Technical Individualization

According to Simondon, the technical object unfolds across three levels: the technical element, the technical individual, and the technical ensemble.³ Beneath the threshold of the individual lie the

technical elements—components such as diodes. The technical individual itself, as exemplified by a turbine, is constituted through the integration of its elements within an associated milieu. Finally, the interrelation of multiple individuals gives rise to technical ensembles, such as factories or laboratories (Simondon, 2024, pp. 48, 114).

While Simondon's analysis of technical objects is oriented toward hardware and industrial systems, Yuk Hui shifts the focus to digital objects and emphasizes that their associated milieux—constituted by users, databases, algorithms, and network protocols—are sustained by inherent stabilizing mechanisms. Moreover, technical individualization is intricately linked to these mechanisms, as Yuk Hui explains below:

The evolution and concretization of these mechanisms allow a digital object to develop and integrate an associated milieu of its own, which is what Simondon calls a technical individualization, whereby something corresponds to what was illustrated before as the objectification of data or schematization. (Hui, 2018, p. 50)

More specifically, in Yuk Hui's account of digital objects, languages such as HTML evolve to facilitate the objectification of data and its movement toward formal abstraction, thereby creating an associated milieu and enabling the individuation of digital objects. "Digital objects are always within a process by which they gradually become more concrete and individualized" (Hui, 2018, p. 65). Similarly, AI can be understood as a technical individual undergoing a continuous process of individualization.

On the one hand, artificial intelligence operates as a technical individual. "Regardless of the domain in which AI is applied, it is fundamentally about training models" (M1, 2023, June 16). ChatGPT and DeepSeek are illustrative examples. As large language models, ChatGPT and DeepSeek both rely on the Transformer architecture and massive parameter counts, continuously refining themselves through training to evolve a digital associated milieu. Their divergence stems from the specific architectural optimizations, datasets, and training objectives employed by their respective teams. For instance, DeepSeek leverages a Mixture-of-Experts (MoE) architecture and a Multi-head Latent Attention (MLA) mechanism to optimize efficiency (Liu, 2025, February 19). Consequently, while ChatGPT supports multimodal inputs and exhibits greater proficiency in English-language tasks, DeepSeek excels in Chinese-language processing. On the other hand, AI is engaged in a continuous process of individualization. When algorithms and data-processing technologies are understood as technical elements that are continuously optimized, large language models, as technical individuals, can likewise be continually adjusted, and new forms of technical individuals may emerge, such as Manus. Prior to the widespread adoption of the Transformer architecture, systems such as Dreamwriter were already capable of automated writing and later incorporated new model components.

Crucially, although technical objects are governed by inherent operational laws, they remain embedded within the matrix of human practice; consequently, there remains space for subjects to exercise their agency. Technical enthusiasts increasingly exercise their agency while adapting to technological trends, as illustrated by the popularity of "AI Stefanie Sun" in 2023. In fact, even before its viral rise, edited videos of Luo Xiang were already being produced within the "ghost" (remix/parody) community on Bilibili (M2, 2023, June 16). As AI technologies continue to develop, audio-editing software has become increasingly sophisticated, while the practices of technical enthusiasts have progressively incorporated AI elements, enabling them to create technical individuals aligned with their own intentions. Drawing on different technical pathways, M3 developed two domestically produced AI voice-changing applications in China, described as "a

synthesis of the cinnabar furnace and refined elixirs.” M3 continuously updates these systems to lower the technical barriers to training AI voice models while providing the infrastructural conditions for users individualized “elixir-refining” (training and fine-tuning) practices, and offers digital tools and resources free of charge.

In the field of digital intelligence, the practices of technical enthusiasts foster Humean technical-discursive relations governed by the logic of automated data processing, as web technologies render such relations less noetic and more materialized (Hui, 2018, p. 131). In this process, technical enthusiasts themselves also become what Yuk Hui (2018, p. 50) describes as technical individuals. However, unlike Yuk Hui’s emphasis, rather than focusing solely on software systems, technical enthusiasts develop an understanding of the underlying operational logic of AI systems, thereby simultaneously shaping the trajectory of technical individuation.

Technical Individuation

Individualization concerns the internal dynamic evolution of technical objects, reflecting discursive relations in the Humean sense. By contrast, “individuation corresponds to ontology—a theory of being-in-the-world” (Hui, 2018, p. 95), emphasizing the operation of structures and relations and thereby revealing an existential mode of relation in the Heideggerian sense. Yuk Hui (2022, p. 26) illustrates individuation through a chemical analogy: crystallization. Supersaturation in a sodium chloride solution creates ionic incompatibility, generating a tension that demands restructuring and manifests as crystallization. Through heat transfer, this process reconfigures the surrounding environment. Ultimately, the formation of the crystal brings individuation to a metastable state.

Yuk Hui’s analysis centers on the individuation of digital objects, which are enmeshed in a network of relations. More concretely, the environments of the Internet of Things and social media together constitute a technical system that, in turn, shapes intersubjectivity and gives rise to interobjectivity. When interobjectivity is understood as “the materialization of both the internal and external relations of objects,” the resulting materialized interobjectivities generate their own milieux, connecting both nature and artifacts while also rendering time in a navigable topological form (Hui, 2018, pp. 147–148, 170).

Mirroring the structure of digital object systems, the individuation of AI transcends mere technical-discursive relations, manifesting instead as an existential network within the human-machine coupling. This system operates according to its own internal causal, structural, and temporal logics. However, unlike traditional web technologies—where HTML-based languages rely on lightweight client-side execution—contemporary models like ChatGPT and DeepSeek necessitate a formidable material substrate. The training of large language models (LLMs) requires prolonged temporal investment and vast computational resources—conditions often accessible only to major commercial entities due to the staggering economic barriers. As one enthusiast noted, “a single graphics card might cost over a hundred thousand, and a larger model may require hundreds of such cards” (M18, December 8, 2024).

Constrained by limited resources, technical enthusiasts engage in reflexive evaluations of hardware and software systems to meet their own needs. This process enables them to reconcile their technical goals with material realities, leading to the development of small-scale, private models. “AI Stefanie Sun” is a case in point, emerging as a product of such training—colloquially referred to among practitioners as *liandan* (炼丹, “elixir refining” or alchemical refinement). This training process consumes substantial computational resources and time. Hardware may run continuously for a 12-h session, consuming 500 to 600 watts of power, yet still result in failure—an outcome

jokingly described as a “cauldron explosion.” In such cases, the entire alchemical process must be restarted (M2, June 16, 2023). M3 characterizes his own process as having a 90% failure rate, vividly describing it as “the furnace blows up nine times out of ten” (June 19, 2023).

Facing the risk of failure in their encounters with AI, technical enthusiasts constantly engage with the technology in a ready-to-hand manner—grappling with it through processes of observation and concern (Besorgen). Within these human–machine interactions, technical enthusiasts reflect on the operational logic and temporality of AI systems. These enthusiasts “perform local deployment” (M7, June 18, 2023), “prepare the database, train the models, or just switch models” (M2, June 16, 2023), and “fine-tune network parameters” (M17, November 24, 2024). “Training time is closely related to the size of the corpus,” as M19 (December 2, 2024) observes, “it sometimes requires an entire day to achieve acceptable results.” Consequently, “the larger the model, the longer it takes to tune” (M18, December 8, 2024).

To achieve satisfactory training results and reach a state of individuation balance, M3 seeks to optimize algorithmic configurations by pushing the limits of various module settings—testing minimum VRAM (Video Random Access Memory) requirements and reducing the hardware and software constraints associated with voice-changing “alchemy.” By leveraging open-source, pre-trained base models, M3 further reduces data requirements and minimizes training epochs through precise technical adjustments. Beyond individual practice, M3 continuously updates his voice-changing software and has established technical exchange groups to share these “alchemy” techniques and to provide peer-to-peer support to users. Similarly, while establishing technical exchange groups, M13 developed voice models based on Stefanie Sun and Jay Chou, thereby moving toward a provisional state of individuation balance. Although this state remains precarious and entails the risk of human subordination to machines, such a process of individuation nonetheless generates significant psychic and collective resonance.

Psychic and Collective Individuation

Whereas Gilbert Simondon’s work centers on mechanology, Bernard Stiegler develops an organological approach that unifies Simondon’s concept of individualization with the individuation of technical objects, while positioning tertiary retention as the fundamental condition of psychic and collective individuation (Hui, 2020, p. 262). Extending this framework, Yuk Hui incorporates the notion of tertiary protention into his analysis of retention–protention circuits, a move that received Stiegler’s endorsement. Furthermore, Hui defines the term by stating: “by tertiary protention, I refer to the fact that in our everyday lives, technology becomes a significant function of the imagination” (2018, p. 209).

Digital objects embody tertiary protention—neither an anticipation of immediate experience nor a prediction derived from empirical inference. For example, whereas individuals in the internet era would turn to search engines such as Google or Baidu when faced with questions, those in the era of digital intelligence increasingly seek assistance from LLMs such as ChatGPT and DeepSeek. The outputs generated through AIGC often align with users’ expectations. As one technical enthusiast notes, the interface was rendered graphically in seconds, and relevant testing confirmed the AI’s ability to deliver services that meet human needs (M17, November 24, 2024). Another observes, “When I lack design inspiration, I can use it to generate creative ideas” (M14, July 3, 2024). Similarly, after M13 refined a vocal model of Stefanie Sun, they anticipated that it could be used to “alter the timbre of other voices” (2023, June 21).

Training AI to mimic a singer’s voice demonstrates how individual and collective experiences are reduced to data and numerical representations. In this process, recursive algorithmic operations

generate a form of tertiary protention that integrates into the transcendental imagination. This shift signals the emergence of a new relational synthesis: a “fourth synthesis”⁴ (Hui, 2018, pp. 229, 231). In the Kantian framework, synthesis proceeds through three distinct stages: first, apprehension in intuition; second, reproduction (or recollection) in the imagination; and third, recognition in a concept. Drawing on Stiegler’s analysis of memory, Hui contends that the rise of tertiary protention and retention gives rise to a new mode of relational synthesis—a “fourth synthesis.”

This transformation signals the incorporation of technical systems into human memory and foregrounds the symbiotic condition of contemporary human–machine relations. Such a relation is inseparable from the force of transduction, which shapes individuation at both the psychic and collective levels. For Simondon (2024, p. 127), transduction is primarily a matter of information transmission; within a cybernetic framework, the human functions as a transducer, much like a machine. Stiegler, by contrast, shifts the focus to the transductive relation between the “who” (the human subject) and the “what” (the technical object), arguing that it is through the interplay of these operations across heterogeneous entities that processes of co-individuation unfold (Stiegler, 2010, p. 7). However, for Yuk Hui, transduction also implies convergence, “which concerns the interoperability and compatibility (as well as incompatibility) between humans and machines, seeing them as a structure that is at the same time individual and collective” (2019, p. 179).

While the philosophy of technology views transduction as a cooperative process between humans and machines, humans are becoming increasingly embedded within systems of technical objects. Yet, when viewed through the lens of fan studies, a distinctly subjective dimension could be imparted to the process of transduction. Transduction in my reading reflects the subject’s agency in a manner similar to fandom, yet it endows that participatory agency with specialized technical knowledge. The practices of technical enthusiasts manifest this form of agency that operates across processes of psychic and collective individuation, thereby generating significant social and cultural consequences. Transduction is perhaps best exemplified by technical enthusiasts’ distinctive creations, such as AI-powered voice changers. M3 developed AI-powered voice changers and leveraged his technical expertise to establish exchange groups that foster community engagement. Although his work has attracted nearly 500,000 followers and millions of likes on Bilibili, he has not allowed commercial interests to interfere with the pace of his open-source development. Drawing on open-source resources, many technical enthusiasts have learned to transform raw digital elements into sophisticated works of their own. The most prominent example is the “AI Stefanie Sun” trend, which has had a notable social and cultural impact.

Technical enthusiasts are driven not only by passion but also by aspirations for economic return. M17, for instance, chose to pursue entrepreneurship and achieved a measure of commercial success. Observations from this study indicate that, although success is often contingent upon chance, there is no shortage of entrepreneurial actors among technical enthusiasts. Having reshaped their own life trajectories through AI, they seek to use this technology to drive broader social change. In pursuit of this goal, they develop AI software, contribute to open-source data initiatives, and engage with professional communities at industry conferences to pursue partnerships and commercial support. Through these practices, technical enthusiasts have significantly enhanced their capacity for transduction, while also using it to overcome certain structural constraints. For example, despite being based in a region with limited economic resources, M14 demonstrates considerable skill in using AI to create ethereal, dreamlike images. He has constructed a distinctive world at the intersection of AI and art and, on Little Red Book (Xiaohongshu), has amassed over 30,000 followers and nearly 300,000 likes and saves, thereby generating an additional income stream while enhancing his social recognition.

Within the transductive practices of technical enthusiasts, primary, secondary, and tertiary retentions interact dynamically, thereby manifesting processes of individuation at both psychic and

collective levels. Moreover, when viewed through the lens of fan studies, these practices exhibit a distinct form of subjective agency, exerting a clear socio-cultural influence and possessing the latent capacity to drive structural change.

Conclusion

Geek studies tend to privilege subjective agency over the evolution of technical objects, while the philosophy of technology frequently maps technical operations at the expense of the subject. In the age of AI, we must ask how agency remains possible. Addressing this question requires both a grasp of AI's internal logic and an analysis of the conditions that enable action. As the practices of technical enthusiasts demonstrate, familiarity with technical operation processes does not diminish agency; rather, it provides the very foundation upon which it is exercised.

Moving between the philosophy of technology and fan studies, this research examines the processes of individualization and individuation within generative AI and the concurrent exercise of subjective agency. Furthermore, this study investigates how technical enthusiasts, grounded in an understanding of technical operational logic, actively develop technical, cultural, and social dimensions that enable meaningful human intervention.

This study finds that technical enthusiasts enact their agency through processes of technical individualization and technical individuation at both psychic and collective levels.

Firstly, from the perspective of individualization, AI technologies, as technical objects, undergo ongoing processes of individualization. In the age of AIGC, these objects exhibit a significantly higher degree of automation than in earlier periods and, in conjunction with humans, contribute to the formation of an associated milieu. Through their engagement with AI, technical enthusiasts become entangled in the mode of existence of technical objects, thereby assuming the status of technical individuals who enter into both technical-discursive and ontological relations with machines. Crucially, this relationship is not passive. Rather, these practices demonstrate that technical enthusiasts actively participate in—and fundamentally drive—the ongoing processes of technical individualization and individuation.

Secondly, from the perspective of individuation, and diverging from Simondon's machinic perspective and Hui's ontological inquiry into digital objects, technical enthusiasts could engage with AI systems in a more integrated manner. They are able to synthesize reflections on hardware and software infrastructures with an awareness of algorithmic causality and temporality, depending on the context of engagement. Through the continuous "tuning" of AI systems—metaphorically adjusting the "recipe" and "heat" of an alchemical process—they generate increasingly refined outputs and ultimately stabilize the process of individuation.

Thirdly, within the processes of psychic and collective individuation, the "elixirs" refined by technical enthusiasts function as tertiary retentions while simultaneously constituting tertiary protentions. Through the circuit formed by primary, secondary, and tertiary retentions and protentions, together with the transudative practice among technical enthusiasts, individuation is continuously realized at both the psychic and collective levels. Unlike traditional philosophies of technology, which often treat transduction as a form of transmission or convergence, this study introduces a fan studies perspective. From this vantage point, the process of transduction among technical enthusiasts could be understood as a form of active agency—one that exerts cultural influence and possesses the power to transcend structural constraints.

Regarding agency, we further interrogate the critical stance of the philosophy of technology and the group upon which it places high expectations, culminating in a summary of this paper's reflections on agency.

Stiegler notes that the “technical artefact always opens a field of indefinite possibilities. This field of possibilities ranges from the worst to the best” (2019, pp. 82–83). Pharmacologically, Stiegler understands tertiary retention as a *pharmakon*—a poison that can also function as a remedy. On the one hand, this process of technical exteriorization facilitates the retention of knowledge and memory; when operating in dynamic synergy with primary and secondary retentions, it actively drives the process of transindividuation.

On the other hand, following Adorno’s critical lineage, Stiegler highlights how the dominant logic of consumer capitalism captures and redirects attention, precipitating both proletarianization and disindividuation. Within this framework, algorithmic logic further intensifies these effects: as automated processes increasingly circumvent the mind’s deliberative functions, they foster a condition of systemic stupidity and generalized stupefaction (Stiegler, 2019, pp. 41, 44).

While Stiegler, Yuk Hui, and others anchor their hopes in the technical expertise of artists and engineers, Simondon looks toward the technician, extolling an alchemical capacity that aligns material production with spiritual regeneration (Chabot, 2013, p. 137). This study highlights a distinctive form of “alchemy” practiced by technical enthusiasts—a power that extends beyond mere technical skill. It is a transformative capacity to generate new cultural and social spheres, operating as a structure-breaking force with the potential to transcend established social constraints.

In conclusion, much as the internet era transformed nearly everyone into a “geek,” the age of generative AI unlocks a universal potential for “alchemy.” Driven by passion, ordinary individuals can now discern the underlying patterns of their interests and exercise a form of agency that yields transformative creative power. Nevertheless, understanding the interplay between systemic constraints and individual agency remains an essential task for further exploration.

Key Interview Questions

1. Have you heard of “AI Stefanie Sun”?
2. On platforms such as Bilibili, are there potential legal risks associated with producing content like “AI Stefanie Sun” videos or AI model training practices?
3. How do you feel about content generated by AIGC software? How technically challenging is the model training process? Are you generally satisfied with the final results?
4. Have you ever developed any AI programs or software on your own?
5. How do you usually improve your skills?
6. Have you joined any online or offline technical communities? Have you ever created any sharing groups or channels yourself?

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Notes

1. Based on the materials I have gathered, research on technical enthusiasts is typically situated within the field of fan studies and is closely associated with the geek culture of the Internet era. Geeks and technical enthusiasts constitute a subcategory of fan communities. Since every era has its own form of technical enthusiasts, those in the Internet age are commonly referred to as “geeks” or “hackers” (though it should be noted that these terms may differ in their legal implications).

In the era of AI, this paper adopts the term “technical enthusiast.” Beyond foregrounding such enthusiasts in the context of generative AI, this terminological choice is informed by considerations of Chinese–English translation as well as its conceptual scope within the philosophy of technology. Based on the English-language literature reviewed, the Chinese term “jike” (极客) corresponds to “geek,” while “jishu aihaozhe” (技术爱好者) is commonly rendered as “techno-enthusiast” (Coget, 2011; Garofalo, 1998; Uwalaka, 2020). Existing research suggests that techno-enthusiasts across various domains tend to exhibit openness to emerging technologies and actively adapt to them; in turn, such technologies may afford these individuals varying degrees of agency and resistance. However, this paper translates “技术爱好者” as “technical enthusiast.” This choice reflects an alignment with Yuk Hui’s line of thought: “In our inquiry, we use the word technical more often than technological to denote a broader conception of technics, as well as the possibility of transforming negative technologies into something favorable.” (Hui, 2018, p. 29)

Akin to geeks, technical enthusiasts share a similar level of curiosity and passion for technology. However, in terms of Chinese–English translation and philosophical nuance, the two terms can be distinguished. I argue that, in the era of AI, the term “technical enthusiasts” is more empowering, as it highlights the ability of ordinary individuals to actively participate. This perspective underpins the central argument of this paper: that ordinary people can possess the technical “magic” to shape and transform reality.

2. Technical objects: In Simondon’s view, a technical object is not merely a tool or a machine, but a technical individual composed of technical elements and its associated milieu (milieu associé).
3. Technical ensemble: In Simondon’s view, a technical ensemble constitutes a complex system, organically emerging from the interplay of various technical individuals.
4. Fourth synthesis: In the Kantian framework, synthesis proceeds through three distinct stages: first, apprehension in intuition; second, reproduction (or recollection) in the imagination; and third, recognition in a concept. Drawing on Stiegler’s analysis of memory, Hui contends that the rise of tertiary retention gives rise to a new mode of relational synthesis—a “fourth synthesis.”

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