The Resonant Structure of Technology: From Image to Creativity

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A thesis submitted for the degree of

Doctor of Philosophy

April, 2026

Abstract

This thesis examines how artistic practice can profoundly reshape our understanding and use of artificial intelligence. Current AI exists dialectically as both opportunity and crisis. Its primary opportunity lies in dramatically expanding the foundational forms of human collaboration—quantitatively and combinatorially—thereby extending the boundaries of collective intelligence and creativity. Rather than merely augmenting existing tools, this expansion reconstructs collaboration itself as a distributed, emergent, and networked process, shifting human intelligence from individual or small-scale modes toward global-scale, cross-species, and human–machine hybrid co-creation. At the core of the thesis lies one fundamental question: how might artificial intelligence be guided toward an organic integration into planetary intelligence? Can it move beyond the dominant paradigm of statistical fitting and recursive automaticity to become an open, resonant, and truly symbiotic node within a planetary intelligence network? This question frames the entire study as a concrete response to the structural tensions exposed by contemporary generative models and agentic systems. While AI greatly amplifies collaborative potential, it remains, as an autonomous technical entity, in a stage of insufficient intelligence. Numerous cases demonstrate that it achieves only statistical prediction and pattern replication (Audry, 2021), falling short of genuine open-ended creation(Zylinska, 2020b). These limitations generate systemic concerns regarding uncontrollability and unintended consequences. Nevertheless, as an open technology, AI can still be steered toward more organic integration into planetary civilization and human decision-making through sustained, multi-perspective human intervention (Bridle, 2022). Contemporary artificial intelligence fabricates quasi-existents and abstract subjects—simulacra of consciousness, affect, and creativity—that lack intrinsic vitality or being-in-the-world. This process disrupts fundamental distinctions between existence, humanity, and intelligence, resulting in alienation of subjectivity and the degradation of a resonant organic world into a computable megastructure(Hui, 2019b)(Hui, 2024). In this context, artistic practice emerges as an irreplaceable epistemic path. The practice developed in this thesis functions not as illustration of pre-existing theory but as a dynamic research apparatus: an interlocking system of input, processing, output, and feedback that makes AI' s preferences, boundaries, and response modalities traceable, while actively reshaping

human meaning-making and relationality.

Acknowledgements

Grateful acknowledgment is extended to Professor Charlie Gere and Professor Emma Rose for their insightful supervision, intellectual guidance, and continued support throughout the course of this research. Their expertise and encouragement were vital to the development of this work.

Appreciation is also due to colleagues in the Department of Computer Science, in particular Gao Peng and Haoran Peng, for their valuable contributions in sharing technical insights and conceptual perspectives on artificial intelligence, which significantly informed both the theoretical and practical aspects of the project.

Acknowledgement is given to the academic institutions, research teams, and technical support personnel whose infrastructure and assistance provided the essential foundation for this study. Special thanks are offered to Liang Liao and Wen Huaduan for their dedicated support in the technical implementation of the AI practice component.

Profound gratitude is reserved for the author' s parents, whose unwavering love and support during critical periods made the pursuit of this work possible. Sincere thanks are also extended to the friends who, with extraordinary patience and generosity, endured repeated appeals for emotional support during moments of psychological stress throughout the doctoral process.

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Introduction

In this thesis I look at how art practice can profoundly alter and develop our understanding and use of artificial intelligence. Current AI exists dialectically as opportunity and crisis. Its most salient opportunity lies in greatly expanding foundational forms of human collaboration in quantity and combination ways. This amplifies boundaries of collective intelligence and creativity. This expansion is not simple tool augmentation. It reconstructs collaboration itself as distributed, emergent networked process. Human intelligence shifts from individual or small-scale traditional modes to global-scale, cross-species, and human-machine hybrid scaled co-creation. This thesis revolves around one fundamental question: how might artificial intelligence be guided toward an organic integration into planetary intelligence? Can it surpass the current paradigm dominated by statistical fitting? Can it become an open, resonant, and truly symbiotic node within the planetary intelligence network? This question orients the entire chapter—not as speculative fantasy, but as a concrete response to the deep structural tensions revealed by contemporary generative models and agentic practices. Current AI exists dialectically as both opportunity and crisis. First, in quantity and combination ways, it greatly expands the foundational forms of human collaboration. This amplifies boundaries of collective intelligence and creativity. However, as an independent technical entity, AI remains in the stage of insufficient intelligence. Many actual cases show it only achieves statistical prediction and recursive automaticity (Audry, 2021). It cannot truly handle open creation(Zylinska, 2020b). These cases trigger systemic concerns about AI' s overall nature: it creates problems humans have not fully digested and potential uncontrollability. Some uncontrollability presents negative (not neutral) consequences. Nevertheless, AI is a technology under open development. Through continuous participation and multiperspective intervention, humans can still hope to guide it toward more organic and intelligent integration

into planetary civilization development and human decision processes(Bridle, 2022). Contemporary artificial intelligence fabricates quasi-existents or abstract subjects: simulacra of consciousness, affect, and creativity that nonetheless lack any intrinsic vitality or being-in-the-world. This fabrication disrupts our inherited distinctions —what is existence, what is human, what is intelligence?—yielding an alienation of subjectivity, a rupture of relationality, and a world progressively degraded from resonant organic field to computable, preemptively occupied megastructure(Hui, 2019b)(Hui, 2024) . In this context, artistic practice emerges as an irreplaceable path. Art does not merely express pre-existing theory; it generates knowledge through its own operational process. The artistic practice developed in this thesis is therefore not a declarative illustration of concepts but a dynamic research apparatus: an interlocking device of input, processing, output, and feedback that allows the preferences, boundaries, and response modalities of AI to surface in traceable forms, while simultaneously reshaping the viewer' s pauses, detours, comparisons, and re-inputs—thereby reconstructing the coordinates of meaning and relationality between humans and world.

0.1 Background and problems: relational, pluralistic, and cosmological

Since Descartes, humans have sought to understand how intelligent machines truly are by thinking with them. According to Bates, there is no pure natural intelligence that stands in simple opposition to artificial intelligence. Automaticity refers to unconscious, mechanical reaction processes in the body and brain. These processes run like a machine following fixed rules. Autonomy refers to the freedom of the mind, decision-making ability, and creativity. It can break conventions, set its own rules, and produce new things. These two are not mutually exclusive. They always pull and define each other on the same ontological level. Thus, human existence is essentially an artificial automaton. It constantly reproduces itself in the small gap between nature (passive mechanisms that constitute us) and the artificial (the world we actively build). This tension between automaticity and openness, between creativity, serves as evidence that technology has been deeply embedded in human existence from the beginning. Bates draws on André Leroi-Gourhan's theory.

He defines humans as beings with a technically exteriorized mind. Thought and intelligence are externalized beyond the body through tools, language, and external media. This forms a decentered subject. Intelligence is environment-dependent. It always unfolds in specific environments. Biological perception and action are embedded in ecological niches. Humans further extend this through technology into artificial environments, networks, and social structures Bates, 2024.

There is no doubt that the continuous development and deep embedding of artificial intelligence have reshaped the way humans interact with the world. In this era of widespread AI deployment and constant reshaping of productivity and technological forms, how should we examine the current relationship between humans and technology?

In Bratton' s *The Stack: On Software and Sovereignty*, the "stack" is established as the ontological skeleton of contemporary existence and a planetary-scale governance apparatus. The concept of "stack" borrows from the computer stack. In computers, the stack is a basic and intuitive data structure and memory mechanism. It works like a stack of plates: you can only add from the top (push) and remove from the top (pop). It follows last-in-first-out (LIFO) rules. Computers use it to manage temporary information quickly. For example, during function calls, local variables and return addresses are pushed onto the stack top. When the function ends, they pop from the top. This is fast and handled automatically by the system. Bratton borrows this concept to stack the entire planet. It forms an accidental megastructure composed of Earth layer, Cloud layer, City layer, Address layer, Interface layer, and User layer. This structure is not intentionally designed. It results from the self-organization of global computing infrastructure. Under this architecture, existence is no longer an autonomous entity prior to technology. It is thoroughly stacked: sovereignty, subjectivity, and reality itself are produced and mediated by interaction protocols across layers. The "User" is no longer a transcendental subject with essential dignity. It becomes a functional position generated and maintained jointly by the Interface layer and Address layer protocols (Bratton, 2016).

Artificial intelligence is also seen as part of The Stack. It is especially at the intersection of the Interface layer and User layer. Agentic AI blurs the boundary between interface and user. AI is not only the interface (with which users interact). It also becomes a semiautonomous User. It coexists with humans in the User layer.

Bratton argues that AI may replace the classic computing stack built over the past 50 years. It forms an AI Stack. This is not human-dominated. It is a comprehensive reconstruction: AI infrastructure reshapes the Earth layer (resource extraction), Cloud layer (data centers), City layer (smart cities), and so on.

Thus, Bratton holds a complex attitude toward AI. On one hand, AI is inhuman intelligence. It may clear away humanist daydreams. It helps us face ecological and financial crises. On the other hand, without active design, it may lead to Cloud feudalism. Corporate platforms will monopolize sovereignty. Humans then degrade to secondary roles. Bratton' s stack appears more like a spliced and architected super-monster. His framework predicts technical future forms of existence. Yet this future is not so beautiful.

Fortunately, Bratton is not the only one observing the future holistically. In Bridle' s *Ways of Being: Animals, Plants, Machines*, the future deepens in ecological and relational terms. Bridle starts from a "more-than-human" ontological position. His opening uses a scene from Epirus in northwest Greece: "The late summer sun lingers on the mountainsides and the still waters of the lake... it is here that one of the greatest conflicts of our age is being played out –between human agency and the intelligence of machines, and between the illusion of human superiority and the survival of the planet." (Bridle, 2022). In his view, technology (especially artificial intelligence) is not a cold layer in the stack. It is one "ways of being" of planetary intelligence. Intelligence is not exclusive to the human brain. It emerges from relations, interactions, and environmental embedding. AI forms parallel forms with the deformable cognition of octopuses, chemical signal networks of plants, and mycorrhizal networks of forests (Wood Wide Web). They together participate in the efflorescence of intelligence. Bridle links emergence mechanisms in the natural world with the ecosystem of our intelligence. He points toward possibilities for human and planetary flourishing (Bridle, 2022). Thus, technology must shift from current extractive, colonial technological ecologies to symbiotic technological ecologies. This enables interaction with the non-human world. Future existence becomes relational co-constitution. Humans, machines, animals, and plants weave dynamic networks of planetary intelligence together. This injects vitality, openness, and ecological dimensions into technological ontology.

Similarly, Yuk Hui in *Machine and Sovereignty: For a Planetary Thinking* achieves a political-cosmological synthesis and transcendence(Hui, 2024). In

the preface, Hui proposes to develop a *Tractatus Politico-Technologicus*. He states that political forms are technological phenomena. Sovereignty, historical narratives, and modes of existence are produced and legitimized by specific technological epistemologies. Bratton' s stack architecture proves that modern Western universalist technology has led to severe homogenization and entropy increase crises. For Hui, the fundamental way out lies in promoting technodiversity: cosmotechnics from different civilizational traditions engage in epistemological diplomacy. They generate symbiotic matrices of biodiversity, noodiversity, and technodiversity. This opens true planetary thinking and planetary coexistence (Hui, 2019a).

Notably, in *Recursivity and Contingency* , Yuk Hui constructs a dynamic ontological genesis framework for contemporary philosophy of technology. Its core treats organic individuation as a speculative scheme. This book lays a solid foundation for his cosmotechnics thought. In the context of Anthropocene technological crises, algorithmic contingency, and ecological disasters, it offers a path beyond the mechanical-organic binary opposition. It ultimately points to cosmotechnical pluralism. Technology shifts from destructive totality to generative, relational participant in existence (Hui, 2019a).

0.2 Yuk Hui's individuation dynamic system

Yuk Hui emphasizes that organic individuation does not return to mystical vitalism or simple biological entities. It redefines the "organism" as a dynamic process of self-organization and recursive becoming. This process marks a fundamental break from Cartesian mechanism. The mechanical worldview relies on linear causality and pre-established harmony. Organicity introduces feedback loops, self-reference, and openness to contingency. Systems shift from closed predetermined forms to autopoiesis-like open evolution.

Recursivity is the driving force of this framework. It is not mechanical repetition. It is a spiraling movement of returning to itself to determine itself. The system constantly calls itself, evaluates itself, and introduces difference in each cycle. This realizes ontogenesis. Hui traces this concept from Kant's reflective judgment (in *Critique of Judgment*, dealing with organic teleology) to Hegel's mechanical organicism, then to cybernetics' feedback mechanisms (such as Wiener's

cybernetics). Recursivity frees systems from predetermined rules. It turns toward internal generation and self-determination.

Contingency is the necessary condition. In traditional philosophy, contingency is often limited by natural laws (such as Kant's modal problems). In technical systems, contingency becomes a positive input that enriches the system and drives evolution (as in machine learning, where noise/deviation optimizes models). Hui critiques Meillassoux's "absolute contingency" as too abstract. He proposes positive contingency: systems integrate contingency into necessity through recursion. This forms unique singularity. It avoids closed entropy increase and totalization crises.

This dual logic of recursivity and contingency elevates organic individuation to a speculative scheme for contemporary crises. In the computational totality dominated by AI algorithms and ecological collapse, it restarts organic thinking. Technical systems open to external environments. They absorb contingency, generate difference, and realize non-deterministic freedom and symbiosis. Ultimately, this framework leads to technodiversity and planetary thinking: technical forms under different cultural cosmologies engage in epistemological diplomacy. They form plural cosmotechnical landscapes. This avoids the single hegemony of the mechanical paradigm (Hui, 2019a).

Here we see that humans always exist in the gap between natural mechanisms and artificial constructions. They constantly reproduce themselves in this tension zone. Technology is not an external tool attached to human life only recently. From its origin, it has been deeply embedded in human existence. Through tools, language, and various media forms, mind and intelligence are continually externalized into environments, networks, and social structures. Intelligence is no longer merely an internal individual capacity. It gradually becomes an environment-dependent, distributed unfolding process.

In the present, this externalization process is further amplified by global computing infrastructure. When artificial intelligence deeply embeds into planetary-scale technical architecture, it not only changes modes of knowledge and production. It also reshapes sovereignty structures, subject positions, and basic frameworks for understanding reality. However, this shift brings new tensions and anxieties. In the era of increasingly complex human-technology relations, the subject gradually retreats from anthropocentric centrality to a functional position in the system. Accompanying this are structural crises such as platform monopoly, ecological

destruction, and cultural homogenization.

It is against this background that more thinkers shift their gaze from binary narratives of technological utopia or catastrophe. They turn to possible paths of ecological symbiosis and political diversity. They attempt to re-understand technology's position. Technology no longer acts as a destructive total structure dominating the world. It becomes a generative, relational participant in existence. In complex life networks, it unfolds new forms of prosperity together with humans, non-humans, and environments. My discussion formally enters from here. I attempt to start from the ontological relations of individual existence. Based on the important Chinese philosophical concept of "xiang" (image), I lock onto a structural resonant relation. This serves as ontological-level thinking for technology.

0.3 which kind of relationality?

Hui's research indeed opens important paths. He proposes that different cultures develop unique cosmotechnics—the integration of cosmos and technology (Hui, 2019a). He briefly points to "xiang" as a resonant field. This echoes Joseph Needham's interpretation of Chinese correlative thinking as sympathetic resonance. However, this thread has never received substantial development. It is incorporated into his concepts of recursivity and contingency.

Moreover, I greatly appreciate Quentin Meillassoux's "necessity of contingency" and its ultimate derivation of "hyperchaos" (Meillassoux, 2008). It provides a radical non-correlationist foundation for contemporary metaphysics. In *Recursivity and Contingency*, Hui explicitly borrows this concept (Hui, 2019a). He pushes the contingency encountered by recursive systems toward the occurrence of absolute contingency. This opens unforeseeable fissures in controlled recursive loops. However, in my view, this path has internal flaws. The openness it brings is a "helpless freedom". Contingency breaks system closure. Yet the emergence of individual richness and plurality star from in forms that "cannot be included, cannot be identified". This plurality is essentially despairing and fragmented. It cannot achieve fusion or unity at higher levels.

If Hui's thinking in his first book *Cosmotechnics* holds (Hui, 2021)—that Chinese tradition indeed contains a thinkable technical thought—then it should rest on some unified foundation under "heaven-human unity" values. In Chinese

thought, subject-object relations are not opposition or conquest. They are co-creation relations: heaven-human unity, thing-self interpenetration, resonance of xiang all point to an intrinsic harmonious generative order. This co-creativity is precisely preserved and deepened in Heinrich Rombach's structural ontology framework. Structure is not a rigid frame restricting freedom. It is the intrinsic generative mode of freedom. Through tension, rhythmic differentiation, and self-transcendence, it constantly ascends. It realizes open symbiosis in relations, rather than relying on contingent ruptures to escape closure (Rombach, 1971).

In my understanding, Hui's pluralism resists the occurrence of contingency through richness in quantity. Perhaps in structural thinking, contingency can repair the openness and flexibility of its own structure to adapt to changes. Does this mean I pull Hui's discussion back from the hard-won non-correlation into correlative thinking? After all, Meillassoux sees Heidegger's Ereignis as the peak of correlationism. Rombach's entire structural ontology is extracted from this concept of Ereignis.

I do not think so.

Contingency in Meillassoux's "hyperchaos" becomes unconditional, subjectless absolute. But when Hui borrows it, he treats it merely as absolute unpredictability. Thus it needs plurality to respond. Yet if absolute contingency can be responded to, then this contingency has not fully upheld the radical "hyper". He embeds contingency within a recursive structure as the internal condition for system novelty generation (contingency within recursion). This is already a return to some "weak correlation": contingency, though unpredictable, is still "captured" by recursive processes and transformed into individuation events. This already distances from Meillassoux's hyperchaos. Hui's contingency ultimately serves the system's openness and diversity generation. It carries traces of "system-internal correlation".

Furthermore, Rombach's structural ontology extracts from Heidegger's Ereignis yet transcends Heidegger's correlationist peak. It does not center on human Dasein. It treats relation itself as the primordial condition of existence. Structure is not connection between pre-existing entities. It is the dynamic process of generative appearing. Freedom (contingency) does not intrude from outside. It is the tension ascent and self-transcendence intrinsic to structure. This "transcendence within structure" precisely preserves the co-creativity of Chinese thought (heaven-human unity, thing-self interpenetration, resonance of xiang). It is not human subject's

correlative projection onto the world. It is self-organization and harmonious generation of the relational field—a non-anthropocentric, non-subject-centered open unity (Rombach, 1971).

Therefore, my structural framework does not retreat to correlationism. It responds to Hui's "despairing plurality" with "resonant structure". It does not rely on ruptures of absolute contingency for plurality. Through internal tension, rhythmic differentiation, and semantic reconstruction, structure self-repairs, adapts, and ascends in change. It realizes an inclusive yet non-effacing unity. Plurality here is not fragmented. Through the resonant field of xiang, it mediates into higher-level harmonious order.

0.4 Dynamic generative mechanism: Structural co-creation and resonance of xiang

Structural ontology (Strukturontologie, proposed by Heinrich Rombach) treats "structure" as dynamic, relational generative process, not static entity (Rombach, 1971). Co-creation theory is the core interpretation of creativity under this ontological framework. Creation is not free expression of individual subjective will. It is the intrinsic channel through which structure realizes self-regulation and self-unfolding (Selbstentfaltung) via individuals.

In Rombach's structural ontology, structure itself is full of internal tension, fissures, and incompleteness (heterogeneity, non-integration). When structural relations become imbalanced, ruptured, or functionally exhausted, the individual is no longer an isolated "subject". It becomes a key node (Knotenpunkt) in the dynamic network of structure. Creative action is thus passively triggered. It is not active "invention". It is the "destined" response imposed by structure on the individual to restore sustainability. The individual bears dual roles: on one hand, it carries structural rupture and becomes bearer of tension reconciliation; on the other, through action it reconstructs relational networks, generates new structural order, and establishes its own position of existence ,"self" is not pre-given essence but node gradually formed in structural relations.

Co-creation is symbiotic generation between structure and individual: structure ascends (Aufstieg) through the individual; the individual gains existential

meaning in structure. This co-creation is not anthropocentric "cooperation". It is ontological mutual constitution. Structure depends on individuals as mediators to maintain openness and historicity. Individuals complete their own individuation in responding to structural heterogeneity. Rombach emphasizes that this mechanism makes creation the necessary mechanism for structure's self-maintenance and self-transcendence, not accidental capacity (Rombach, 1965–1966).

We back to the logic of xiang.The *Xici Zhuan* proposes "establish xiang to exhaust meaning" (Lynn, 1994). It emphasizes that xiang is not representation of existing objects. It is a form capable of presenting relations and change structures. For example, "Yi has Taiji, which gives birth to two yi; two yi give birth to four xiang" (Adler, 2019). This is not a physical narrative of cosmic generation. It explains how order unfolds through structural differentiation: from unity to difference structures, then to multi-layer relational systems. Through this structural arrangement of xiang, tensions and changes in the world organize into understandable and responsive forms. In this framework, ganying (resonance) constitutes the key mechanism for xiang to function. The *Xici* says "heaven and earth resonate, and myriad things transform and generate" (Lynn, 1994). It emphasizes not linear causality but mutual responsive relational process. Different forces trigger each other in the same structural field. This forms new order and forms. This generative way clearly echoes Rombach's described structural co-creation. In both theoretical frameworks, creation is not unilateral production by subjects. It is the process where internal tension of relational structures gradually unfolds through certain mediating mechanisms. Structural ontology understands this mechanism as structure realizing self-unfolding through individuals. Xiang's thought emphasises transforming potential order into concrete forms through induction and resonance. From this angle, xiang can be understood as a resonant structure: it provides a framework for organizing relations among differential forces. Creation appears as a continuous generative cycle—relational structure provides a formal framework; tension activates and responds within it; new order gradually manifests in this resonant process.

Here, we roughly outline the comparative foundation centered on co-creation. This foundation differs in background from Hui's dynamic generative structure. Rombach's structural co-creation provides a rigorous Western dynamic mechanism. Induction of xiang injects living Eastern resonant dynamics. So far, this is the main

thinking of my first chapter. If my discussion holds, then a generative dynamic system based on resonant subject-object relations can be constructed. This means I have a reasonable foundation for thinking about technical problems.

0.5 From generative to artificial intelligence

The first chapter essentially proposes a replacement scheme for Hui's recursive and contingent individuation dynamics of the organic (Hui, 2019b). We place our gaze in Rombach's structural ontology and the xiang framework under the Chinese philosophical subject-object relations perspective for reshaping. As a philosophical exploration from the perspective of technology, it should prioritize direct response to specific technical issues. However, from the perspective of xiang, Chinese tradition lacks an independent systematic technical discourse to directly respond to current technical situations. Rombach's discussions on systems and structures critique how system control logic kills uncertainty and contingency (Rombach, 1971). He proposes structural freedom and the possibility of many systems evolving toward many structures (Rombach, 1971). Yet there remains a time lag with today's AI development. I do not deny that the structural perspective deserves richer unfolding in technical topics. In the latter part of the first chapter, through cases of Chinese character input methods in different eras, I preliminarily prove the existence possibility of structural technology (Mullaney, 2017).

Nevertheless, directly entering AI topics from the structural framework may still provoke questions about logical leaps and topic generalization. But, I believe discussion of current AI issues is an effective attemptive response path. Current AI exists dialectically as both opportunity and crisis. First, in quantity and combination ways, it greatly expands the foundational forms of human collaboration. This amplifies boundaries of collective intelligence and creativity. However, as an independent technical entity, AI remains in the stage of insufficient intelligence. Many actual cases show it only achieves statistical prediction and recursive automaticity (Audry, 2021). It cannot truly handle open creation (Zylinska, 2020b). These cases trigger systemic concerns about AI's overall nature: it creates problems humans have not fully digested and potential uncontrollability. Some uncontrollability presents negative (not neutral) consequences. Nevertheless, AI is a technology under open development. Through continuous participation and multi-

perspective intervention, humans can still hope to guide it toward more organic and intelligent integration into planetary civilization development and human decision processes (Bridle, 2022).

0.6 Opportunity

Current AI exists dialectically as opportunity and crisis. Its most salient opportunity lies in greatly expanding foundational forms of human collaboration in quantity and combination ways. This amplifies boundaries of collective intelligence and creativity. This expansion is not simple tool augmentation. It reconstructs collaboration itself as distributed, emergent networked process. Human intelligence shifts from individual or small-scale traditional modes to global-scale, cross-species, and human-machine hybrid scaled co-creation.

This logic roots in AI's generative and predictive mechanisms. Through neural networks processing massive data, generating countless variations, and predicting future states, AI is no longer static auxiliary tool. It becomes dynamic collaboration joint. It allows countless human participants—artists, scientists, or ordinary users—to instantly form unprecedented combinations with algorithms and non-human intelligence (such as ecosystems or historical data). This breaks traditional creativity's physical, cognitive, and temporal boundaries. This is the core of dialectical opportunity: AI shifts collaboration from anthropocentrism to eco-technical symbiosis. It amplifies emergent potential of collective intelligence. It injects open variability into creativity.

For example, in James Bridle's *Ways of Being*, I clearly see AI as an organic component of planetary intelligence. It collaborates with animals, plants, machines. Together they weave networks of more ways of being. Bridle points out that if intelligence arises from mutual relations, common thinking, and work, it needs no "artificial" label. AI does not replace humans. It opens doors to other minds. It helps us engage deep collaboration with non-human intelligence. This expands collaboration forms in scale, from purely human-centered to planetary symbiotic networks. It ultimately amplifies the ecological dimension of collective intelligence (Bridle, 2022). Lev Manovich and Emanuele Arielli in *Artificial Aesthetics* further point out that generative AI has brought visual media into the programmable aesthetics era. Through tools like Midjourney or DALL · E, users and AI jointly

generate countless variant forms. This realizes immortal collaboration. It expands collective boundaries of design and art appreciation (Manovich and Arielli, 2024).

In recent years, numerous empirical studies reinforce this view. Thomas P. Kehler et al. in their 2025 paper propose the Generative Collective Intelligence (GCI) framework. They argue AI is not only intelligent agent but social and cultural technology. It bridges human reasoning and machine models. It helps groups overcome traditional communication barriers and jointly solve complex problems. This directly confirms AI's expansion effect in quantity and combination: it fuses human creativity with AI computational power. It forms collective intelligence far exceeding the sum of individuals (Kehler et al., 2025). Likewise, Eric B. Zhou et al.'s 2025 paper analyzes large-scale data from online art platforms. It finds that generative AI (especially open-source Stable Diffusion release) first enabled a few masterminds to continuously break creative frontiers through productivity surges. It then rapidly evolved into hive mind. More ordinary creators participate in exploring new ideas. This overall accelerates expansion of human creative boundaries (Zhou, Lee, and Gu, 2025).

Actual cases also vividly confirm this expansion. Midjourney and Stable Diffusion allow millions of global users to collaborate instantly via prompts. They generate billions of images. This forms unprecedented distributed creative networks. A single user can borrow massive training data and others' styles for cross-cultural, cross-style combined creation. DeepMind's AlphaFold project has AI tightly collaborate with global scientists. In the 2020–2021 CASP14 competition, it solved the 50-year unsolved protein folding problem. It predicted over 200 million protein structures. This not only releases collective intelligence. It directly pushes boundaries of drug design and biomedicine (Jumper, Evans, Pritzel, et al., 2021). AI realizes unprecedented externalization of human intelligence. It paves the way for future more organic, intelligent planetary civilization turn (Stanford Institute for Human-Centered Artificial Intelligence, 2025).

0.7 Crisis

Generative AI relies on neural networks, backpropagation, and large-scale training data. It minimizes error to predict most probable outputs. This mechanism excels at pattern recognition and statistical induction. Yet it is essentially recursive:

it continuously optimizes in existing patterns rather than truly facing unknown or contingency. This causes difficulties in handling open creation. Human creation often stems from failures of anticipation, interruptions, and redirections. AI's errors are only quantifiable parameter adjustments. They cannot transform into true creative gaps or ontological breakthroughs. This insufficiency is not capability lack. It is ontological absence: AI lacks structural sensitivity to contingency. It cannot reconstruct itself in truly novel situations. David W. Bates clearly points out this problem. He notes "Prediction is the essence of intelligence" (citing Yann LeCun). Yet the pathology of contemporary machine learning systems lies in technologies of prediction. They settle into states. Yet they cannot truly err or create openness. Bates emphasizes that ML's prediction mechanisms, though efficient, expose the unique advantage of human intelligence: autonomy and creative gaps in errors. This makes me deeply realize that AI's insufficient intelligence is not technical imperfection to be fixed. It is historical construction: it continues the automaticity tradition from Descartes to cybernetics. Yet it cannot cross to truly human-like openness (Bates, 2024). Yuk Hui's concept of tertiary protention in *Recursivity and Contingency* perhaps provides a useful perspective for understanding some core mechanisms of contemporary AI. Tertiary protention means algorithms preemptively occupy and close possibility spaces through recursive self-setting of future premises (Hui, 2019a). Hui points out that digital technology transforms Stiegler's tertiary retention into preemptive tertiary protention. In tertiary protention, AI is not passively remembering the past. It actively pre-stores the future. It reduces contingency to computable probability loops. This recursive pre-storage makes AI appear efficient. Yet fundamentally it closes cosmotechnical diversity and ontological difference. If AI remains only in such tertiary protention automatic loops, it cannot handle truly novel events. It can only repeat homogenized statistical outputs. We see many forms of protention observed. Here AI's insufficient intelligence exposes the internal closure of statistical prediction and recursive automaticity through tertiary protention's recursive pre-occupation and abstract simplification of ideal subjects. It cannot truly touch gaps of open creation. Large language models like ChatGPT can only repair hallucinations through parameter fine-tuning. They do not truly create new knowledge or reflect on errors. DALL · E series in handling cultural specificity, always falls into statistical homogenization. It cannot produce truly subversive open creation. Latest

research in 2025–2026 reinforces this judgment. For example, studies show GPT-4o and similar models surpass humans in divergent thinking and insight problem-solving. Yet they significantly lag in creative writing and representation change tasks. They lack human-like forward flow and trade-off strategies. This indicates AI's creative output relies more on non-creative mechanisms than true thinking processes. In *Creativity in AI: Progresses and Challenges*, authors point out current AI architectures optimize most probable results. This fundamentally limits truly human-like creation: it excels at generating poetry, images, music. Yet in tasks requiring abstract thinking, compositionality, and problem-solving, it struggles. Outputs lack diversity, originality, long-range coherence. They often accompany hallucinations and factual inconsistencies (Ismayilzada et al., 2025). However, the aforementioned crises and systemic concerns are not AI's endpoint. They are turning points in dialectical process. AI as open-developing technology has future not doomed to closure or catastrophe. It depends on how humans guide it through continuous participation, multi-perspective intervention, and structural reconstruction. They guide it toward more organic, intelligent integration into planetary civilization development and human decision processes. This turn is not optimistic utopian fantasy. It is realistic path based on history, technical philosophy, and contemporary practice. AI's insufficient intelligence precisely exposes its plasticity. It is not unchangeable automatic machine. It is still-evolving technical genesis. For example, open-source AI models (Llama series, Mistral) allow global community structural intervention in architecture. They inject diverse data and ethical constraints. EU AI Act and UNESCO AI ethics frameworks push responsible AI governance. Interdisciplinary projects like AI for Earth and Planetary Intelligence Initiative embed AI in ecological monitoring and climate decision-making. These cases show AI's openness continues evolving. Humans through continuous participation and multi-perspective reconstruction strive to gradually guide it toward organic, intelligent directions (Bridle, 2022; Hui, 2024).

0.8 Starting from algorithmic ontology of machine learning

Our discussion continues to unfold under the perspective of guiding artificial intelligence to organically integrate into planetary intelligence. Artificial intelligence (AI) as rapidly evolving interdisciplinary field usually classifies from multiple complementary dimensions. These dimensions nest layer by layer rather than strictly mutually exclusive. Mainstream academic and industry consensus (based on Russell & Norvig's *Artificial Intelligence: A Modern Approach* (Russell and Norvig, 2021) and latest reports like Stanford AI Index 2025 (Stanford Institute for Human-Centered Artificial Intelligence, 2025)) divides AI mainly into following levels: first, by capability/intelligence level, including narrow AI (ANI, all currently deployed AI excels only at specific tasks like image generation, text continuation), general AI (AGI, theoretically cross-domain human-level intelligence, still unrealized in 2026, but o1/o3 series test-time compute reinforcement learning accelerates approach (OpenAI, 2024; OpenAI, 2025)), and super AI (ASI, self-improving system surpassing all human cognition, still pure theory). Second, by function/operation mode, including reactive machines (no memory, no learning, only instant response), limited memory machines (learn from historical data with short-term memory for decision, covering most modern ML models including generative models), theory of mind (future stage, can understand human emotions, beliefs, intentions), and self-consciousness (pure theory). Third, by technical implementation/paradigm, mainly symbolic AI (rule- and logic-based reasoning, now revived via neuro-symbolic hybrids for explainability), connectionist AI (data-driven learning based on neural networks, current dominant form including deep learning and generative models), and other/hybrid paradigms (evolutionary computation, fuzzy logic, Bayesian networks). Under connectionist paradigm, machine learning (ML) as AI's largest subset has main learning paradigms: supervised learning (labeled data, learn input-output mapping), unsupervised learning (no labels, mine data structure), semi-supervised/self-supervised learning (few labels + massive unlabeled, core of modern large models), and reinforcement learning (trial-error + reward optimization strategies). Generative AI as recent hot term refers to systems creating new content (LLMs, multimodal generation, diffusion models etc.). Almost all rely on deep

learning and generative models. This thesis mainly discusses algorithmic ontology of machine learning's generative models. Other directions temporarily outside core discussion. They await other chapters or extended research.

0.9 The ideal of generative models

In 2023, David Watson's ontological and epistemological analysis of generative models, especially generative adversarial networks and tree-based forest models, provides profound technical interpretation for the necessity of contingency (here not Meillassoux's contingency and necessity, but closer to expression of predictive accuracy). Models must simultaneously capture necessary essence (low-dimensional data manifold, the part that must exist) and contingent realization (high-dimensional unrealized possibilities, the part that may exist). Thus generative modeling transcends mere prediction. It enters domains of creative imagination and fantasy (Watson, 2023).

This insight bases on two complementary propositions. Epistemologically, we precisely identify unrealized possibilities through generative models or similar models representations—that is, cognize through imagination. Ontologically, under ideal conditions, unrealized possibilities are exactly what models should learn. They define boundaries of possible worlds. This dual task is not mere technical detail of data synthesis. It precisely realizes the individuation process at creativity's core(Watson, 2023).

In generative adversarial networks, generator starts from abstract noise. It engages zero-sum game with discriminator. Through continuous iteration on uncertainty boundaries, system finally reaches Nash equilibrium. At this point, output is no longer isolated artificial construct. It becomes concrete technical individual with intrinsic resonance. It autonomously projects real distributions. Forest models take another path: they divide input space bottom-up (leaf nodes/sub-regions). This realizes progression from elements to individuals to sets. It forms parallel aggregated relational structures.

Under ideal state, image generation appears as structured manifestation of unrealized possibilities and contingency of necessity. It becomes core medium field for system's structural response to difference. It lets abstract manifold and concrete distribution, historical training data and future unrealized possibilities mutually

guide. Generative adversarial networks' top-down thematic unity and forest models' bottom-up detail aggregation reconstruct dual modes of human imagination at algorithmic level. Models thus no longer seen as mere replication of existing things. They reorganize past experience into future possibilities. This completes individuation process of generative model ‘s creativity.

If our thinking on technology's resonant structure holds, then understanding of generative models should also be resonant. In Watson's view, generative models and generative ways express as modes of their individuation existence. And the meaning of generative models lies in inquiry into the necessity of contingency. We can also extend Hui's dual saying of recursivity and contingency. One is the algorithm's computation of the necessity of contingency in prediction. Two is the co-creation of the necessity of contingency under human-machine symbiosis in structure.

0.10 Does it really have creativity?

A particularly intriguing discovery emerges from a close reading of Yuk Hui's Recursivity and Contingency: his recursive and contingent dynamics of individuation furnish a contemporary technical-philosophical extension and actualization of Gilbert Simondon's theory of creativity (Hui, 2019a). In Simondon, individuation and transduction situate creativity as the emergence of novel structures, whereby a system resolves difference amid metastability to actualize new forms. By 2025–2026, this framework has rapidly assumed centrality in debates surrounding creativity in generative models—Diffusion architectures and Transformer-based systems among them. Numerous recent contributions invoke Simondon's cycle of the image and transduction to elucidate leaps within latent space, the passage from noise to structured form, and the technical individuation proper to artificial systems (Simondon, 2023; Aires, 2025; Kerruish, 2025). Simondon's thought on creativity yields not merely a robust ontological account of generative models but also a direct provocation for algorithmic innovation. One might, for instance, reconceive transduction as structural propagation across the latent diffusion manifold—propagation de proche en proche—or integrate internal resonance into the adaptive modulation of attention mechanisms. Such gestures displace models from mere statistical reorganization toward genuine processes of individuation. Pursuing the comparative trajectory further, we place Simondon's conception of creativity

alongside the framework of structural creativity developed in this thesis, which draws upon Heinrich Rombach's Strukturontologie and the resonant dynamics of Chinese xiang (Rombach, 1971). When these two perspectives are brought to bear on the same generative model—DDPM or Stable Diffusion, for example—and creativity is interrogated ontologically, they converge upon a fundamental insight: creativity consists essentially in the system's structural response to difference. The provenance of this difference—internal or external—demands sustained inquiry. From the Simondon–Hui vantage, difference arises predominantly externally, through dysfunction in the pre-individual milieu or the injection of contingency, thereby effecting recursive re-coordination between system and world. In Rombach's structural ontology—and in the resonant field of xiang incorporated here—difference originates internally as the inevitable expression of structure's generative tension, non-integrability, and intrinsic contradictions.

Creativity, along with the capacity for difference and individuation, thus constitutes the most primordial dimension of structure: structure is never a closed form but a dynamic resonant field perpetually in ascent (Aufstieg), inclined by its very nature to respond to internal tension through self-reconstruction. The fascination of this observation resides precisely in the manner by which difference is internally disclosed—an inquiry that remains central to the present work. In evaluating contemporary models, however, one observes that they exhibit only quasi-subjective sensitivity and improvisational capacity, while their overall individuation remains profoundly limited.

The unresolved problem carried forward from the second chapter is thus the continued interrogation of this internal opening to difference.

0.11 About difference

The discussion in this chapter revolves around one fundamental question: how might artificial intelligence be guided toward an organic integration into planetary intelligence? Can it surpass the current paradigm dominated by statistical fitting? Can it become an open, resonant, and truly symbiotic node within the planetary intelligence network? This question orients the entire chapter—not as speculative fantasy, but as a concrete response to the deep structural tensions revealed by contemporary generative models and agentic practices.

In the preceding chapters, we have examined the intrinsic logic and inherent limitations of generative models from both algorithmic-mechanistic and ontological perspectives. To sustain output continuity, these models recurrently simplify difference through recursive prediction and probabilistic anticipation, thereby compressing the world into a statistically fittable plane. Engineering advances—through continual model scaling, hybrid architectures, quality-diversity algorithms, and the like—undoubtedly enhance output diversity and mitigate homogenization (Stock, 2025). Yet such paths remain limited: they rarely demonstrate how algorithms might reconfigure symbiotic relations between humans and non-humans, or between humans and machines, within actual relational fields. Even less do they allow suppressed differences and contingencies to manifest in traceable, felt, and cosmotechnically significant ways.

Contemporary artificial intelligence fabricates quasi-existents or abstract subjects: simulacra of consciousness, affect, and creativity that nonetheless lack any intrinsic vitality or being-in-the-world. This fabrication disrupts our inherited distinctions—what is existence, what is human, what is intelligence?—yielding an alienation of subjectivity, a rupture of relationality, and a world progressively degraded from resonant organic field to computable, preemptively occupied megastructure (Hui, 2019a; Hui, 2024). In this context, artistic practice emerges as an irreplaceable path. Art does not merely express pre-existing theory; it generates knowledge through its own operational process. The artistic practice developed in this chapter is therefore not a declarative illustration of concepts but a dynamic research apparatus: an interlocking device of input, processing, output, and feedback that allows the preferences, boundaries, and response modalities of AI to surface in traceable forms, while simultaneously reshaping the viewer' s pauses, detours, comparisons, and re-inputs—thereby reconstructing the coordinates of meaning and relationality between humans and world.

The core observation of this chapter is that the structural tensions manifested in generative models and agentic practices constitute the algorithms' genuine dilemma in confronting difference. On one side, models recurrently simplify difference in order to preserve continuity; on the other, suppressed differences and contingencies inevitably re-emerge in real deployments as misrecognition, drift, collapse, hallucination, and so forth—becoming intrinsic forces that compel structural reorganization. My proposition is this: if we cease attempting to preemptively close these differences

and instead truly open them, artificial intelligence may attain an infinite creativity that is genuinely embedded in structural genesis.

The notion of infinite creativity is hardly novel. As early as 2015, Kenneth Stanley and Joel Lehman articulated the concept of open-endedness: a system is truly open only when it continuously generates novel and learnable products rather than converging toward fixed optima. Its decisive insight is that the telos is not arrival at an endpoint but perpetual continuation of the process itself—an essential condition for artificial superintelligence, since only the ceaseless emergence of learnable novelty permits escape from human-prescribed goal horizons (Stanley and Lehman, 2015a).

Technically, attempts have included quality-diversity algorithms, test-time transduction, multi-agent world models, and related directions, which have demonstrated efficacy in recent conferences. Yet they confront enormous computational expense, ambiguous evaluation criteria (novelty and learnability remain irreducibly subjective), susceptibility to mode collapse or loss of control, and—more fundamentally—the persistence of statistical fitting as the central paradigm, lacking any long-term intrinsic drive toward exploration. From the standpoint of generative models, these efforts remain embryonic and demand deeper philosophical reflection to attain resonance.

It is precisely for this reason that the chapter turns to artistic practice, understood as a privileged domain for repairing ontological ruptures and producing knowledge. The inquiry unfolds around three interrelated questions: first, how ought humans and machines to organize together? (a renewed interrogation of subjectivity); second, how to confront differences and contingencies that remain incompletely controllable? (directly implicating explainability and the handling of non-human dimensions); third, on the basis of the preceding two, can we concretely envision the possibility of infinite creativity? These questions are grounded in the structural response to difference and ultimately converge toward an openness to infinite creativity.

In selecting a philosophical framework, I initially explored object-oriented ontology (OOO). Proponents contend that contemporary AI generative art demonstrates that creation need not depend on a human subject but can arise from autonomous relations among technical objects—furnishing a contemporary instantiation of objective autonomy. Yet I soon found Harman' s framework epistemologically

unpersuasive: its insistence on perpetual withdrawal of objects and the emergence of value through indirect allure nevertheless presupposes human-experienced allure for judgment, thereby harboring a concealed anthropocentrism (Harman, 2018).

This aporia directed me toward the ancient Chinese perspective of the equality of all things and Heinrich Rombach' s structural ontology. The latter transcends traditional phenomenology by displacing static structures of consciousness toward the dynamic generative processes of structure itself: through concretization, self-forgetting, ascent (Aufstieg), and self-critique, structure continually augments its density and vitality. Judgment is internalized within structure; humans become merely one selectable node among others. This trajectory aligns closely with Chinese relational thinking and offers a non-anthropocentric alternative for comprehending AI subjectivity (Rombach, 1971).

On this basis, the first section elaborates structural subjectivity. Sougwen Chung' s Drawing Operations series initially conveyed this intuition: machines cease to be passive instruments and manifest as co-creative partners within interactional interstices. The conversational iterations of contemporary AI platforms exhibit profound similarity—interaction itself elicits intense social responses; the other is no longer mere illusion but a structural effect, with judgment positions shifting cyclically. This engenders algorithmic subjectivity (Chung, 2015).

Consider, my 2025 installation AI Sovereignty Declaration (Invisible Poem): the system ingests real-time images from the exhibition space, segments them via visual models, generates templated short poems through language models, and projects deformed calligraphy back onto the site—forming a continuous closed loop. Three thresholds render judgment publicly traceable; viewers' pauses, circlings, comparisons, and re-photographing fold the other back into subsequent cycles. In contrast to street inscription practices, the resulting unreadability is no longer absence of meaning but a mechanism that produces relational consequences.

At the same time, AI' s occupation of a subject position does not entail the deprivation of human subjectivity. On the contrary, it rewrites our position—from sovereign decider to interpreter, maintainer, and co-generator. Subjectivity manifests as the capacity to register these shifts; through interpretation, rejection, or re-input, humans reshape the cycle' s direction. Humans, AI, and environment together constitute a continuously generative situational process in which subjectivity redistributes across tension.

The second section diagnoses the pathology of human–machine collaboration. In asymmetric mirror relations, users perpetually refine prompts to reinforce an ideal self, while algorithms consolidate statistical self-consistency through preference accommodation, mode collapse, and self-reinforcing loops. Both parties return to themselves in the other' s mirror, engendering a highly self-referential closed loop. This game rapidly becomes double uncanny: users confront statistical ghosts that are almost correct yet forever displaced; algorithms experience mode instability under abrupt prompt shifts.

This double uncanny generates entangled traces—a third existence neither purely human nor purely machinic. In my Chinese Character Operative System, the model encounters glyph-association blind spots, resonates with unanticipated user input, and produces a third writing with its own independent rhythm. These traces condition subsequent interactions. Collaboration in ambiguity is the inevitable outcome of tertiary protention: both parties jointly generate novel traces amid mutual misrecognition.

At this crux we inquire further: what essential difference distinguishes this collaboration between AI and humans from historical collaborations between humans and other entities? Is the present dilemma an inherent feature of AI or merely a transitional stage in historical development? Must it conform to "natural" modes of collaboration?

The response is: nature has never been a pure, pristine ecology. It perpetually self-extends through technical mediation. AI' s recursive collaboration constitutes the contemporary planetary-scale form of nature. The updating and integration of AI is not optional but an urgent exigency of planetary thinking: to rebuild sovereignty within a matrix of technical, intellectual, and biological diversity, and to prevent technology from degrading into a singular megamachine (Hui, 2024).

The third section addresses the opening of contingency within structure—namely, the continued inquiry into the problem bequeathed by the preceding chapter. The homogenization crisis in generative models—mass-averaged outputs, hallucinations, black boxes—stems from recursion' s inherent tendency toward closure, with contingency suppressed as mere noise. While Hui' s recursive thinking is profound, it still depends on external plurality for passive opening. The resonant thinking proposed here focus a more intrinsic path.

Uncertainty in models appears as data bias, representation misalignment, and

behavioral failure. In practices such as Chinese Character Operative System, Extending Glitch Edge by 5 cm, Flying White Glitch, and others, I deliberately retain these uncertainties, transforming them into structural events: the system preserves continuity at the edges while exposing and rewriting its associative mechanisms. Finally, I return to the ultimate vision of this thesis. Reflection on structural creativity may constitute the very launch point toward infinite creativity—not an infinite accumulation of statistical novelty, but a relational field that continually redraws its boundaries in tension, transduces difference, and awakens the open breathing of contingency. When difference ceaselessly awakens within resonant networks, when structure becomes an organic node of planetary intelligence, artificial intelligence shifts from statistical fitting to near-infinite generation embedded in cosmotechnics. This question admits no final endpoint, yet it remains the starting point of all my practice: in the depths of structural tension and events, creativity is never an appendage of technology—it is the intrinsic breathing of the relational field in self-unfolding.

At the very end, I venture a more radical judgment. In this resonant structure, inspired by James Bridle' s *Ways of Being*, intelligence is the inquiry into the capacity for collaborative freedom in uncertain environments. According to the logic of this thesis, intelligence must be understood as the maximization of the degree of collaborative freedom within uncertain environments (Bridle, 2022).

Chapter 1

A Discussion on Technological Thought: The Dialogue Between Structural Ontology and *Xiang Thinking*

This chapter lays the philosophical groundwork for the thesis and asks a basic question: from where do we begin to think 'technology'? Rather than starting directly from contemporary debates on AI, I first return to the dialogue between Chinese *xiang*-thinking and modern Western philosophy, and then situate this dialogue within Heinrich Rombach's structural ontology. I begin by revisiting contemporary New Confucianism, especially Mou Zongsan's transformation of Kant. Mou shifts Kant's epistemological boundary-thinking into a moral metaphysics centred on intellectual intuition and an internally luminous mind. This move powerfully reinforces the ethical core of Confucianism, but it also recentres everything on the subject and leaves technology confined to the 'phenomenal" side, unable to enter the core of ontological and value-oriented reflection. To reopen this space, I step back from Mou-style New Confucianism and return to an earlier and more open site of resonance: *xiang*. In the Ru–Dao traditions, *xiang* is not a decorative image but a dynamic structural pattern that organises appearing, sustains relations, and mediates between form, force, and meaning.

On this basis, the chapter introduces Rombach's structural ontology as a

conceptual partner for *xiang*-thinking. Rombach understands being as a field of tensions, which allows the "unity of Heaven and humanity" to be reformulated in non-anthropocentric, structural terms and supports an expanded schema of *Dao*–*Xiang*–*Qi*: *Dao* as generative ground, *xiang* as structural mediation, and *qi* as concrete technical realisation. Working with this schema, I reread a series of technological lineages – from the *Bagua* diagrams and the evolution of Chinese characters to Lin Yutang's Chinese typewriter and Ni Guangnan's associative input method – as cases in which *xiang*-thinking has already been operating as a structural logic inside technical practice. Through this work, the chapter both diagnoses the limits of New Confucian discourse on technology and forges a new link between *xiang*-thinking and structural ontology as a point of departure for a relational, structurally open philosophy of technology, preparing the ground for Chapter Two's discussion of creativity and individuation in contemporary generative AI systems.

1.1 Mou Zongsan's Critical Transformation: The Implosion and Reconstruction of Kantian Philosophy

1.1.1 Neo-Confucian Project: Toward a Constructive Moral Metaphysics: The endlessly self-generating universe

The Chinese philosopher Thome H. Fang (1899–1977) argues that Chinese philosophy expresses a vision of the cosmos as engaged in a ceaseless and creative process of becoming (*shengsheng buxi*). Humanity, along with all living beings, is viewed as an integral part of this cosmic flow, immersed in the dynamic rhythm of the universe's continuous generativity. The cosmos itself thus exhibits a forward-moving, life-infused vitality—what Fang terms a *creative and advancing life force* (Fang and Kuang, 2009, p. 16). This ancient cosmology, inherited from pre-Qin sources, reflects a worldview once shared across early civilisations. What is remarkable, Fang observes, is that China has preserved this view, and Confucianism continues to embody a form of "living religious experience" rooted in this cosmological orientation. In classical texts such as the *Yijing* (Book of Changes), the concept of *shengsheng* (生生)—the unending generation of life—is

interpreted by Fang through Alfred North Whitehead's notion of "the creativity of creativity." That is, all finite forms of life are derived from a primordial creative force that exceeds infinity, and ultimately move toward an infinite realisation (Fang and Kuang, 2009, p. 85). Heaven's Way (*tiandao*) is never static—it advances eternally through creation. For the individual, to face this creative cosmos is to become immersed in its life-giving process of becoming. In contemporary Neo-Confucianism, this primordial creativity is rearticulated through classical Confucian terms such as "original mind" (*benxin*) and "ontological ground" (*benti*), which serve as the conceptual foundation for what modern Confucians call a "moral metaphysics."

From the perspective of contemporary Neo-Confucianism, traditional Western metaphysics is often seen as having severed the intrinsic connection between humanity and the cosmos, presenting a mechanistic vision of the universe that lacks both vitality and emotional resonance. Nature is conceived as an objective realm that operates independently of human experience, governed solely by causal laws. Under this division, science becomes a system of knowledge about nature, concerned with the description and explanation of empirical facts. At the same time, philosophy is relegated to the domain of human values and meaning (Min, 2005, p. 40). Xiong Shili (1885–1968) firmly rejects this dichotomy. He insists that any inquiry into ontology and cosmology must be rooted in human lived experience and existential feeling. Xiong opposes the traditional Western view of ontology as the investigation of a transcendent, self-contained substance beyond the phenomenal world—a view fundamentally incompatible with the life-centred cosmology of Confucian thought. Thus, while Neo-Confucians affirm metaphysics as a central concern of philosophy, they also offer a profound critique of the basic assumptions underlying classical Western metaphysics. Liang Shuming (1893–1988), Xiong Shili, and Mou Zongsan share this orientation. They argue that the ontological ground of the cosmos is not only the foundation for the existence of all things but also the source of moral practice and creative transformation. In this sense, ontology is no longer conceived as an abstract realm of metaphysical substance, but as a structural reality intimately bound to human moral life. This reconfiguration gives rise to an urgent philosophical task: to reconstruct a *moral metaphysics* grounded in the classical Confucian doctrine of heart–mind and human nature (*xin xing zhi xue*), wherein the Confucian *heart–mind* (*xin*) itself functions as the ontological core.

The term *moral metaphysics* (*daode xing'ershangxue*) was first explicitly articulated by Mou Zongsan (1909–1995), one of the leading figures of contemporary Neo-Confucianism. Like many of his contemporaries, Mou was deeply influenced by currents in modern Western philosophy and sought to reinterpret the Chinese philosophical tradition in light of these new intellectual resources. Drawing on the works of Immanuel Kant, Martin Heidegger, Henri Bergson, and Alfred North Whitehead, and building upon the teachings of his mentor Xiong Shili—a foundational figure of modern Neo-Confucianism—Mou gradually constructed a metaphysical system rooted in Confucian thought, which he termed "moral metaphysics." Before delving further into Mou's framework, it is necessary to distinguish between Kant's and Mou's respective conceptions of *moral metaphysics*. For Kant, moral metaphysics centres on the *a priori* principles of morality, treating morality itself as the primary subject of metaphysical investigation. In contrast, Mou Zongsan reframes moral metaphysics within the ethical spirit of Confucianism, redirecting its focus from morality toward broader ontological and cosmological dimensions—namely, a philosophical inquiry into Heaven's Way (*tiandao*). Mou proposes that moral practice is not merely ethical behaviour, but a pathway toward metaphysical insight.

1.1.2 Kant's epistemological structure

Mou Zongsan, following the lineage of Xiong Shili, adopts Kant's nominal distinction between *phenomena* and *things-in-themselves*, accepting the division of the world into *phenomena* and *noumena*. However, Mou strongly affirms the possibility of *intellectual intuition*, through which human beings may come to know the thing-in-itself. Before proceeding further, we must clarify Kant's concepts of phenomenon, thing-in-itself, and intellectual intuition, since Mou's entire philosophical project is constructed through a rigorous reinterpretation and critique of Kantian philosophy. In Chapter III of the *Critique of Pure Reason*, Kant for the first time delineates the boundaries of truth. He introduces the metaphor of the "land of truth" (Kant, 1908, p. 354): what humans can know is like a small inhabited island, surrounded by a vast ocean of the unknown. The parts of reality we have not and cannot yet know stretch out indefinitely beyond the horizon. Philosophers have long aspired to extend human knowledge beyond this island —by means of reason

and transcendent faculties such as *a priori* categories, causality, and substance- in order to reach comprehensive truths about God, the soul, and the totality of the world. But as Kant warns, such efforts are often doomed to failure: they are hopeless ventures driven by intellectual pride, aiming to comprehend what lies beyond experience.

As Deng Xiaomang (1948–)[1] explains, concepts like the immortality of the soul and the existence of God function in Kant's system as *transcendental ideas*, which mark the outer limit of human cognition (Deng, 2018, p. 672). These are boundaries, not attainable objects of knowledge. In Hume's view, even the island of knowledge itself is questionable, merely composed of subjective impressions, perceptions, and ideas. For Hume, knowledge must conform to the object. But Kant reverses this logic: objects must conform to the subject's *a priori* cognitive structures. It is precisely because we construct this land with our faculties that we are able to claim knowledge of it. This is the core of Kant's "Copernican Revolution": humans legislate for nature, rather than passively receiving it. Kant's island metaphor reveals two central threads that directly inform our inquiry:

1. The boundary between reality (the *noumenal*) and appearance (the *phenomenal*);

2. The relationship between human intuitive cognition and the self-manifestation of things.

In Kant's epistemology, knowledge arises from the interpenetration of subject and object. This includes the unity of *transcendental apperception* (the "I think"), the synthesis performed by the *categories of the understanding*, and the manifold of sense intuitions received through *sensibility*. Only through the convergence of these elements does cognition become possible. To better understand the boundary of knowledge as limited by Kant, we must clarify several key concepts: *appearance* (*Erscheinung*), the *thing-in-itself* (*Ding an sich*), and *noumenon*. According to Kant, the path by which a thing becomes knowable proceeds as follows: a thing-in-itself stimulates the senses and gives rise to a manifold of intuitions. These intuitions are shaped by the *a priori* forms of outer sense (space) and inner sense (time),

[1]Deng Xiaomang is a contemporary Chinese philosopher and cultural critic, recognized for his contributions to Kantian philosophy and his engagement with Enlightenment ideals.

resulting in a sensible appearance—a representation of how the thing presents itself. This sensible content is then synthesised by the imagination as a mediating faculty and subsequently brought under the categories of the understanding and unified in transcendental apperception, whereby consciousness and knowledge emerge. It is important to note that *thing-in-itself* and *noumenon* are not entirely equivalent in Kant's philosophy. The *thing-in-itself* refers to the existent as it is in itself, in contrast to *appearance*, which is a representation structured by human sensibility. It is inaccessible to human intuition—a reality beyond the limits of experience. In this sense, it is similar to what Heidegger later refers to as the irreducible "thing" (*Ding*) —that which remains as the ultimate point toward which intentionality is directed, yet cannot be penetrated.

The *noumenon*, by contrast, is not just the thing-in-itself but also a conceptual posit of reason: it designates that which is not a possible object of sensory intuition, but instead something that can be thought purely by the understanding. In this sense, noumenon serves more as a regulative idea than a cognitive object. It has both negative and positive meanings in Kant's system:

- In its **negative sense**, the noumenon refers to a non-sensible object. This being cannot be intuited by the human senses and therefore cannot be an object of empirical cognition. It is accessible only to a hypothetical *intellectual intuition*, which human beings do not possess.

- In its **positive sense**, the noumenon refers to that which *could* be known through intellectual intuition, if such a capacity were available to us.

For Kant, however, since humans lack this mode of intuition, the noumenon remains a *limiting concept*—it marks the boundary beyond which human sensibility and understanding cannot pass.

1.1.3 The Meaninglessness of the Thing-in-Itself as a Boundary Concept

Mou Zongsan's philosophical project begins with what he considers the most structurally problematic aspect of Kantian philosophy: the division between phenomena and the thing-in-itself (*Ding an sich*). In Kant's system, this distinction

operates as a transcendental limit, asserting that while human cognition can access appearances structured by sensibility and understanding, it can never grasp things as they are in themselves. For Kant, the thing-in-itself remains a logically necessary postulate—an ontological "remainder" that secures the boundary of reason, yet one that remains completely devoid of experiential or conceptual content. As Mou Zongsan explains, this structure turns the thing-in-itself into a "zero-like concept," a formal but empty boundary notion, comparable to the abstract zero in mathematics: indispensable for the system's coherence, yet devoid of intrinsic meaning[2].

For Mou, this limitation is not merely technical; it has serious metaphysical and ethical implications. He argues that if the human subject is structurally cut off from ontological reality, then not only knowledge, but moral meaning, becomes metaphysically ungrounded. The bifurcation alienates the self from the ultimate ground of value. In response, Mou undertakes a fundamental philosophical transformation, which is both an implosion and a reconstruction of the Kantian framework. This transformation centres on redefining the thing-in-itself from an epistemological limit into a moral-ontological reality. In Mou's revised system, the thing-in-itself is no longer a hidden or unknowable object beyond experience, but a value-object (*yiyi wu*, 意义物)—a structure infused with moral significance and constituted by the luminous activity of innate moral knowledge, or *liangzhi* (良知) (Mou, 1975, p. 85).

Mou's strategy is not to eliminate the concept of the thing-in-itself, but rather to re-inscribe it within the moral structure of subjectivity. Through innate moral sense *liangzhi*, the heart-mind (*xin*, 心) generates meaning not by abstract conceptualisation but through moral illumination—what Mou calls *zhiti mingjue* (知体明觉), the self-luminous, self-knowing nature of the moral mind. Thus, the thing-in-itself is no longer an unknowable other, but the result of the heart-mind's engagement with reality in its most morally awakened state. By redefining the thing-in-itself as a value-object, Mou constructs a metaphysical model in which ontology and morality are coextensive. This transformation is part of a broader triadic structure Mou develops, corresponding to the Chinese metaphysical framework of *ti–yong–guo* (体–用–果): innate moral knowledge(*liangzhi*, 良知) as ontological

[2]See Mou Zongsan's critique of Kant in his interpretation of moral metaphysics, where he characterizes the *Ding an sich* as a conceptual void that must be overcome through intellectual intuition.

reality (*ti*), intellectual intuition (*zhihui zhijue*, 智慧直觉) as its operative function (*yong*), and thing-in-itself (*wuzishen*, 物自身) as its realized manifestation (*guo*). This structure not only collapses the epistemological gap posited by Kant but also replaces it with a participatory model of metaphysical becoming, in which the moral subject is not a passive knower of appearances but an active co-creator of reality through moral self-limitation (Mou, 1975).

1.1.4 From epistemological to axiological

Mou Zongsan points out that Kant's noumenal domain is not a realm of concrete ontological substances, but rather a dispersed field of abstract regulative ideas—including freedom, the existence of God, and the immortality of the soul. These are not genuine metaphysical entities, but function as regulative concepts that guide reason without yielding ontological knowledge. For this reason, Mou refuses to equate Kant's notion of "noumenon" (*benti*, 本体) with the foundational metaphysical realities in Chinese philosophy, such as *Dao* (道), *Li* (理), or *Taiji* (太极)—which are revalorizations of unified, absolute, and self-generating ontological principles (Lu and Wu, 2011).

On this basis, Mou reinterprets the Kantian *thing-in-itself* (*wuzishen*, 物自身) through a value-metaphysical framework and reconstructs its meaning in two major stages. First, he subordinates the "thing-in-itself" as an *a priori* condition for cognition (i.e., as the ground of synthetic unity in the experience of phenomena) to the broader conception of the thing-in-itself as noumenon, thereby diminishing its epistemological role within the structure of cognition. Second, Mou formalises the thing-in-itself as a noumenon as a value-infused ontological reality—one that is directly grasped through *intellectual intuition* (*zhihui zhijue*, 智慧直觉). This redefined entity becomes the primary ontological basis of the cosmos, not as an external or inert object, but as a moral reality rooted in innate moral knowledge (*liangzhi*, 良知) (Mou, 1975).

Furthermore, Mou integrates this reinterpreted "thing" into the structure of Confucian moral metaphysics, revalorizing it as the "true principle" (*zhenli*, 真理), "true substance" (*zhenzhi*, 真质), and "true reality" (*zhenyou*, 真有)—a structure imbued with moral meaning. In this way, the *thing-in-itself* is no longer a conceptual remainder but is elevated into a *value-object* (*yiyi wu*, 意义物) that embodies what

Wang Yangming described as the "object" of intuitive illumination (*mingde zhi yìng*, 明德之应) (Min, 2005). Building on this reinterpretation, Mou absorbs Kant's three transcendental ideas—freedom, soul, and God—into a unified model of infinite moral subjectivity. He thereby remodels Kant's implicit "3 + x" metaphysical structure into a "1 + x" configuration, in which the single metaphysical source—innate moral knowledge(*liangzhi*, 良知)—serves as the unifying ground for all transcendental values (Amabile, 2011).

Through this reformulation, the entire "realm of noumena" is transformed into a "realm of value" (*jiazhijie*, 价值界), and Kant's rigid distinction between phenomena and the thing-in-itself is reconceived as a moral-philosophical demarcation between the realm of fact and the realm of value (Amabile, 2011). As a result, within Mou's theory of *intellectual intuition*, the relationship between *mind* (*xin*, 心) and *thing* (*wu*, 物) regains a classical Chinese configuration—namely, the structure of "essence and function" (*ti-yong*, 体用) and "mutual manifestation" (*huxian*, 互显), where cognition and being are not separate, but co-generative within a unified moral cosmos.

1.2 Mou Zongsan's mistake?

1.2.1 One Mind, Two Gates

Mou Zongsan proposed the famous theory of "One Mind, Two Gates" (*yi xin liang men*, 一心两门): the human mind (*xin*, 心) is unified, yet it opens two gates of cognition. One is the *finite mind* (*youxian xin*, 有限心), oriented toward the empirical world—it forms knowledge of phenomena through sensory experience and logical reasoning. The other is the *infinite mind* (*wuxian xin*, 无限心), directed toward the noumenal or value realm—it reaches metaphysical moral reality through *intellectual intuition* (*zhihui zhijue*, 智慧直觉). These two gates are not separate or divided, but both originate from the same ontological source: the *original mind* (*benxin*, 本心) of the person.

Through this Chinese-style philosophical transformation, Mou overcomes the epistemic deadlock of Kant's unknowable *thing-in-itself*. The distinction between phenomenon and reality is no longer a structural fissure in the world itself, but a reflection of different modes of human cognition. Drawing upon Buddhist concepts

of *zhi* (执, attachment) and *buzhi* (不执, non-attachment), Mou introduces the idea of "the transformation of one mind" (*yixin zhi zhuan*, 一心之转) as a key to resolving the epistemological dualism embedded in Kant. This transformation does not imply a change in external objects themselves, but a shift in the structure of the *xin* (心, heart-mind) from a state of grasping to one of moral openness.(Mou, 1975)

According to Mou, when the mind operates in a state of *zhi* (执)—that is, when it fixates on objects as separate, reified entities—the world appears as phenomena, shaped by differentiation, opposition, and empirical cognition. This corresponds to the functioning of the *finite mind* (*youxian xin*, 有限心), which structures experience through conceptual analysis and dualistic perception (Mou, 1975, p. 85). That is, the appearance of phenomena is a function of the subject's moral and cognitive posture, not an inherent feature of external things. In contrast, when the heart-mind enters a state of *buzhi* (不执)—letting go of conceptual fixation and engaging the world through moral intuition—the subject no longer apprehends things as fragmented entities, but experiences them as direct manifestations of moral essence. In this non-attached state, the world reveals itself not as empirical data but as *thing-in-itself* disclosed through moral awareness. As Mou explains, the distinction between phenomena and the noumenon is not a metaphysical dualism but a phenomenological differentiation within the moral structure of consciousness. What Kant regarded as a fixed epistemic barrier becomes, for Mou, a dynamic expression of the moral transformation of the *heart-mind* (*xin*, 心).

This marks a radical departure from the Kantian model of subject-object dualism. For Mou, phenomena are not ontologically distinct from the noumenon, but rather represent the "folding" (*zhezhou*, 褶皱)[3] of the innate moral knowledge(*liangzhi*, 良知) as it self-limits to form the empirical world. Conversely, the *thing-in-itself* is not a metaphysical residue beyond reach, but the moral meaning that discloses itself when the mind is no longer attached. In this sense, *yixin zhi zhuan* (一心之转) reorients the very structure of metaphysics: the boundary between

[3] *Zhezhou* (褶皱, zhězhòu): In Mou Zongsan's philosophical vocabulary, *zhezhou* refers to the dynamic process through which the noumenal or moral reality begins to appear as the phenomenal world. It evokes the image of folds or ripples forming on a smooth surface, signifying how the unified ontological ground "wrinkles" into the manifold appearances of phenomena. It is not merely a physical metaphor but a metaphysical articulation of how moral consciousness gives rise to structured experience.

phenomena and reality lies within the dynamic moral states of the *heart-mind* (*xin*, 心), not in the objectified world itself.

From this standpoint, Mou also reclassifies scientific knowledge and technology. He categorises modern technology within the domain of phenomena generated by the *finite mind* (*youxian xin*, 有限心), and emphasises that scientific cognition, based on detached observation, cannot account for the moral insight disclosed by intellectual intuition rooted in the *infinite mind* (*wuxian xin*, 无限心). In fact, Mou argues that the phenomenal world becomes possible precisely because of the sinking of moral knowledge (*liangzhi de kanxian*, 良知的坎陷)[4] into the finite mind, which then triggers the *folding* (*zhezhou*, 褶皱) process.

1.2.2 Intuition of intelligence in Mou Zongsan

In Mou Zongsan's philosophical system, *intellectual intuition* (*zhihui zhijue*, 智慧直觉) is not a mode of cognitive representation whereby a subject perceives an external object. Rather, it is a more fundamental process of ontological resonance and self-generation. Mou uses the term "spiritual responsiveness" (*shen gan shen ying*, 神感神应)[5] to describe the distinctive quality of this intuition. It denotes an inner communion between being and being, rather than a sensory interaction between object and observer, as found in empirical cognition. This form of intuition does not depend on the prior existence of an object, nor does it require the input of sense data. It is the self-luminous, self-manifesting, and self-generating activity of innate moral knowledge(*liangzhi*, 良知). In this intuitive act, the relationship between *mind* (*xin*, 心) and *thing* (*wu*, 物) is not structured as subject and object, but is one of mutual penetration and co-generation. (Mou, 1971)

More specifically, Mou explains: "A thing becomes what it is not by existing

[4] *Kanxian* (坎陷, kǎnxiàn): A term used by Mou Zongsan to describe the self-limiting movement of *liangzhi* (innate moral knowledge) as it enters into the finite structures of empirical consciousness. Far from signifying a fall or corruption, *kanxian* denotes a deliberate, generative contraction, through which the noumenal mind enables the phenomenal world to appear. It is a creative "self-bounding" akin to the Buddhist notion of compassionate descent or the Confucian ideal of self-discipline for the sake of realisation.

[5] *Shen gan shen ying* (神感神应): A term used by Mou to describe the immediate, non-dual relation between being and being, not mediated by sensory experience but rooted in the self-manifestation of innate moral awareness.

as an external entity, but by appearing in the self-illuminating activity of innate moral knowledge(*liangzhi*, 良知)." In other words, things are not entities outside of being, but are the appearances of being itself, generated in the moral intuition of the *heart-mind* (*xin*, 心). This manifestation is not triggered by being observed; rather, it is the unfolding of being as such within the luminous operation of *liangzhi*. Mou names this process "drawing the thing back to the mind" (*she wu gui xin*, 摄物归心): the thing does not exist independently of the mind, but is disclosed precisely where innate moral knowledge(*liangzhi*, 良知) flows. And its manifestation, in turn, affirms the illuminating activity of the mind.

At a deeper level, the relationship between heart-mind(*xin*, 心) and thing(*wu*, 物) in intellectual intuition reaches what Mou calls a state of "mutual illumination in suchness" (*ru ru xiang yin*, 如如相印). Here, *ru ru* (如如) refers to a state of presence free from attachment and discrimination, while *xiang yin* (相印) implies not a mirroring between opposites, but a relation of mutual grounding and mutual manifestation. Mou emphasises: "The knower is the known, and the known is the knower" (*neng jue ji suo jue, suo jue ji neng jue*, 能觉即所觉，所觉即能觉). This kind of luminous revelation is not a reproduction of appearances, but the very self-generation of being itself. That is to say, in intellectual intuition, the "I" is not a subject standing before an object, but the manifestation of moral being itself; and the "thing" is not a passive object of cognition, but the unfolding of being within the illuminating act of the mind. (Mou, 1971, Chapter 4)

This relationship of *ru ru xiang yin* (如如相印) constitutes an ontological logic of generation: *liangzhi* (良知) is Reality (*ti*, 体), *intellectual intuition* (*zhihui zhijue*, 智慧直觉) is its Function (*yong*, 用), and the *thing-in-itself* (*wuzishen*, 物自身) is its result (*guo*, 果). In this structure, the thing is not a passive entity, but the moralised manifestation of *liangzhi*—the externalisation of being through moral consciousness. *Intellectual intuition*, then, is not an abstract faculty of pure insight, but the dynamic radiance of moral being itself, the concrete enactment of the Dao's endless self-generation (*shengsheng buxi*, 生生不息).(Mou, 1971)

The intellectual intuition is not the kind of divine knowledge Kant considered inaccessible to humans. It is, rather, the metaphysical capacity for direct moral apprehension that is already inherent within the original heart-mind (*benxin*, 本心). It not only dissolves the epistemic boundary between mind and thing, but also enacts their inner unity in essence and function, knower and known. Through

"mutual illumination in suchness" (*ru ru xiang yin*, 如如相印), Mou reconstructs a Confucian cosmology in which mind and thing are one. In this vision, the thing is not a distant object to be observed, but the radiant disclosure of the *heart-mind* itself.

In sum, Mou carries out a threefold transformation of Kantian philosophy. Epistemologically, he introduces intellectual intuition in place of the unknowable *thing-in-itself*, affirming the possibility of metaphysical knowledge. Ontologically, he grounds both being and appearance in innate moral knowledge(*liangzhi*, 良知), reconstructing the dynamic relation between reality(noumenon + thing-in-itself) and Function(phenomenon). Axiologically, he reinterprets the thing-in-itself as a moral manifestation—a value-laden object disclosed through ethical awareness. Through this reconstruction, Mou accomplishes a Confucian form of moral metaphysics—one born from a critical engagement with Kantian formalism, and offering a profound response to the Western bifurcation between being and thought, or object and subject.

1.2.3 A Modern Assessment of Mou Zongsan

Mou reconfigures Kant's epistemological humility as metaphysical optimism. What Kant reserves for the divine, Mou situates within the moral heart of the human subject. In the last century, Mou Zongsan accomplished the remarkable feat of single-handedly translating and systematising Kant's three major critiques. However, in contemporary scholarship, an increasing number of Chinese philosophers have begun to identify misjudgments within their interpretations. Yang Zebo, for instance, argues that while Mou sought to bridge the divide between phenomena and the *thing-in-itself*, as well as between sensibility and the *noumenon*, his shift from epistemology to axiology—though highly creative—represents a fundamental departure from Kant's original position (Yang, 2018).

Chen Yingnian further contends that Mou's appropriation of intellectual intuition (*zhihui zhijue*, 智慧直觉), while demonstrating the subjective power of Confucian *moral metaphysics*, in fact deconstructs Kant's critical framework (Y. Chen, 2003). Mou fails to adequately engage with the unknowability of the *thing-in-itself*, and the cosmic creative structure he proposes results in a closed and self-referential theoretical system marked by an inward-turning subjectivity. The

viability of his moral metaphysics remains open to question. Moreover, Mou's claim that intellectual intuition is inherent to human beings blurs the boundaries between perception and creation, thought and being. By eliminating Kant's requirement that all knowledge begins with sense-material given, Mou replaces it with a vision in which the inner light of moral virtue becomes the ground of universal ontological disclosure. Philosophically, this amounts to a form of neo-ontological mysticism.

Setting aside evaluative judgments about the creative value of Mou Zongsan's theoretical innovations, it is difficult to deny that Mou Zongsan misinterprets key aspects of Kant's notion of *intellectual intuition*. In his rendering of "intellectual intuition," Mou uses the Chinese term *zhijue* (直觉), which semantically includes both *direct perception*—the acquisition of knowledge through sensory contact with external objects—and *sudden insight* or *enlightenment* (*wu*, 悟) in the traditional Chinese philosophical sense. This dual semantic range introduces a conceptual slippage. When Mou infuses Kant's cognitive notion of the *thing* (*ding an sich*) with moral value and substitutes *epistemological limitation* with *ontological-moral realisation*, he effectively translates Kantian intuition into the framework of traditional Chinese spiritual insight. What Mou calls *intellectual intuition* (*zhihui zhijue*, 智慧直觉) is not simply a mode of cognition, but a metaphysical mode of moral awakening, deeply rooted in Confucian and Buddhist traditions of *self-cultivation* and *inner illumination*. Thus, the term "intuition" in Mou's context departs significantly from Kant's epistemic register. For Kant, *intellectual intuition* is an impossible mode of human cognition—reserved solely for God, who creates objects through thought. In contrast, Mou reclaims this term as a human capacity for direct access to moral being, realised through innate moral knowledge (*liangzhi* 良知).

For the purposes of this study, what is even more crucial is the observation made by Min Shijun, who argues that Mou Zongsan's claim—that innate moral knowledge (*liangzhi* 良知) is not only the source of morality but also the ontological ground of all things—ultimately transforms the notion of "*liangzhi* creating all things" into an act of *meaning-bestowal*. This move, in which *meaning replaces reality*, has been criticised as absorbing all existence into a "black hole" of *liangzhi*, thereby making it difficult for modern values such as science, democracy, and individual consciousness to maintain any autonomous status.(Min, 2005)

1.3 *Xiang* as Appearing: Appearing: resonance field

1.3.1 Wang Yangming and the Dynamic System of Generative Resonance through *Ji*, (几)

According to Mou Zongsan, moral metaphysics arises from the Confucian original heart (*benxin*, 本心), and the luminous manifestation (*langxian*, 朗显) of this heart in its encounter with the external is precisely the position of *xiang* (象). This position is not merely symbolic; it functions as a specific generative mechanism of appearance. *Xiang* occupies a mediating space between subject and object, relationally binding the world through a dynamic mode of generativity. As Yuk Hui notes, *xiang* implicitly carries with it a distinct Chinese attitude toward science (Hui, 2019b, p 29). This section focuses centrally on *xiang* as a point of resonance, the unity of Heaven and Humanity (*tianren heyi*, 天人合一), and as a site intimately tied to the phenomenological problem of appearance. At the core of our theoretical excavation lies the question: how can we penetrate this generative mechanism in a logical and speculative way, in order to unpack the concealed ontological stance toward science embedded within it?

To begin, we may turn directly to Wang Yangming, the very Confucian thinker who inspired Mou Zongsan. Resonance (*Ganying*, 感应) is the theoretical cornerstone of Wang's doctrine of the extension of innate moral knowledge(*zhiliangzhi*, 致良知). For Wang, the statement "there is nothing outside the mind" is not an epistemological claim. As Chen Yingnian explains, "Wang Yangming could not possibly have denied the objective reality of things"; rather, his real question was: "How do things and the mind each become what they are? How do they acquire their determinations?"(Y. Chen, 2003, p. 14). Therefore, he refrains from speaking of objects external to heart–mind (*xin*, 心), and chooses instead to discuss "things" only as they arise within heart–mind (*xin*) —rejecting any notion of objectivity devoid of subjectivity.

He posits the incipient trigger of resonance (*ganying zhi ji*, 感应之几)—what we here call the originary site of resonance—as the ontological basis for the primordial encounter between human and thing, asserting that the heart–mind (*xin*, 心) and thing (*wu*, 物) are not separately existing entities but co-emerge through the

movement of intention (*yi*, 意). In this framework, the subtle fissure (*ji*, 几) refers not to a static structure but to the subtlest, most originary perceptual opening within the encounter—a rhythm of life that flows in tune with the cosmos.

On this foundation, Wang Yangming expands the practical dimension of his philosophy through cultivation practice (*gongfu*, 工夫), reconceptualising "things"not as objectified substances (*wu*, 物), but as events or situations (*shi*, 事)—i.e., contextual realities engaged through human intentionality and moral response. As Wang writes: "Where intention is, there the thing is."In this sense, *wu* (物) are not predetermined external entities, but emergent fields of encounter constituted in the generative tension between *xin* (心) and its situation.

This relation between heart–mind (*xin*, 心) and thing (*wu*, 物) does not emerge after cognition or via conceptual mediation; rather, it arises organically through the flow of intention (*yi*, 意), emotion, and ethical engagement. For Wang, knowledge and action are not two distinct phases, but unified within the structure of resonance (*ganying*, 感应). "Things"are thus not fixed objects to be known, but moral rhythms constantly appearing through embodied practice. Accordingly, innate moral knowing (*liangzhi*, 良知) is not a derivative moral judgment, but an immediate, affectively grounded discernment of the stirring of intention (*yi*, 意) and the responsiveness of thing(*wu*, 物). From this foundation, Wang rejects the notion that good and evil derive from social norms or divine authority. Instead, he affirms that the heart of right and wrong is present in everyone, emphasising the a priori and intuitive nature of moral knowing.

Thus, good is no longer the product of universal reason or codified law, but emerges from the harmonious resonance between heart–mind (*xin*, 心) and object(*wu*, 物) in particular contexts. Conversely, evil arises when this resonance is disrupted or obstructed. Innate moral knowledge functions not through analytic objectivity, but through the ability to recognize the shape of thing(*wu*, 物), engage the situation or event (*shi*, 事), and intuit the appropriate Way (*Dao*, 道) in each resonant encounter.(Y. Chen, 2003)

In this light, investigating things to extend knowledge (*gewu zhizhi*, 格物致知) must be reinterpreted—not as empirical accumulation, but as ethical attunement and resonant calibration. What we encounter here is not a rationalist system but a living dynamic—an existential current where heart–mind (*xin*, 心) and thing (*wu*, 物) vibrate together. When Wang says "the original nature has neither good nor

evil," he refers to the incipient trigger of resonance (*ji*, 几) as the innate root of life, not as moral doctrine, but as the unfolding rhythm of one's embedded being.

For instance, if the heart–mind (*xin*, 心) desires to gaze upon a flower, the flower is "good"(*shan*, 善) and the surrounding grass "evil"(*e*, 恶). But if one needs the grass, then the grass becomes "good" and the flower "evil." Good and evil do not inhere in things (*wu*, 物) themselves—they emerge only within the situational flux of intentional engagement. However, if one fixes certain *wu* as permanently good or evil, the flowing resonance hardens and stagnates—*wu* becomes alienated, disconnected from *xin*. This is what Wang calls vital force constriction (*qi ju*, 气拘) —a choking of the vital relational current. Innate moral knowledge (*liangzhi*, 良知), in sensing this constriction, does not activate static moralism, but rather ethical discernment of imbalance in the structure of resonance. (Y. Chen, 2003)

To restore this dynamic, *gewu* must be practised—not as empirical inquiry but as *ge* (格, to rectify / release), reopening the subtle *ji* (几, the incipient trigger) of resonance. It is this practice that sustains the resonance between heart–mind(*xin*, 心) and thing(*wu*, 物), prevents stasis, and regenerates their co-generative structure. In this sense, resonance is itself a creative act—not *creatio ex nihilo* as in Western metaphysics, but an emergence from dispersion, a co-manifestation where *xin* and *wu* illuminate one another into being.(Y. Chen, 2003)

Because the moral state of the heart–mind shapes the structure of its resonance, the thing too must constantly shift and change, appearing and disappearing with the pulse of life. The object—imaginable as a rotatable globe—does objectively exist. But an individual, or "user," relates to it through usefulness. When an event arises, the user's intention casts its light upon a certain portion of the object. This "illuminated spot" reflects both the subjectivity of the user's intent and the limited but present objectivity of the thing itself. At this juncture, heart, mind and thing coalesce into a single resonant field—the paradigm of unity of Heaven and Humanity.

However, this alignment is never permanent. The heart–mind (*xin*, 心) is fluid, constantly transforming. To recognise an object's usefulness as "good" often entails viewing what lies outside that use as "evil." Yet when such judgments of good and evil become reified, the dynamic resonance between *xin* and *wu* stagnates, and the system collapses into rigidity. Hence, *gewu* (格物, investigation or rectification of things) becomes essential, not as empirical inquiry, but as an ongoing process of attunement. Through it, human needs and the intentional events arising from

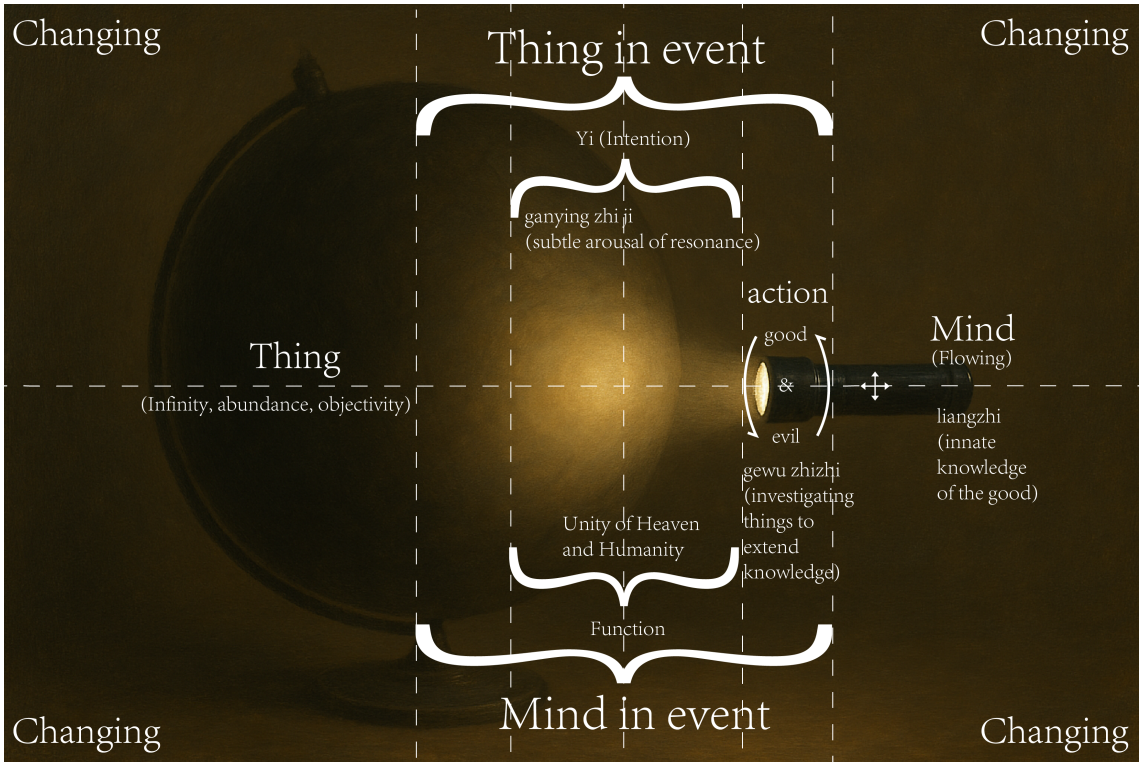

Figure 1.1: Wang Yangming's relationship between thing and mind

the heart–mind shift and flow in synchrony. Concepts of good and evil likewise evolve within this rhythm. The object—here imagined as a metaphorical globe—thus reveals different facets of its objectivity, shaped by the interplay of intention and resonance.

Strictly speaking, the metaphor is imprecise because the object never appears as a fully fixed entity. When Wang Yangming acknowledges the subjective utility of things, he also implies their infinite richness and objective depth. Only by affirming their inexhaustible, complex objectivity can we accommodate the continuously shifting needs of the heart–mind (*xin*, 心) and its resonant responses.

Thus, we are in a stronger position to critique the limitations in Mou Zongsan's formulation. Mou's theory, while deeply inspired by Wang Yangming, ultimately renders innate moral knowledge (*liangzhi*, 良知) into a transcendent source—nature endowed by Heaven (*tianming zhi xing*, 天命之性)—and dissolves resonance into a one-way projection from subject to world. This disrupts the generative interplay between heart-mind (*xin*, 心) and thing (*wu*, 物), and transforms Wang's fluid relational field into a vertical metaphysical-phenomenal structure. As Chen

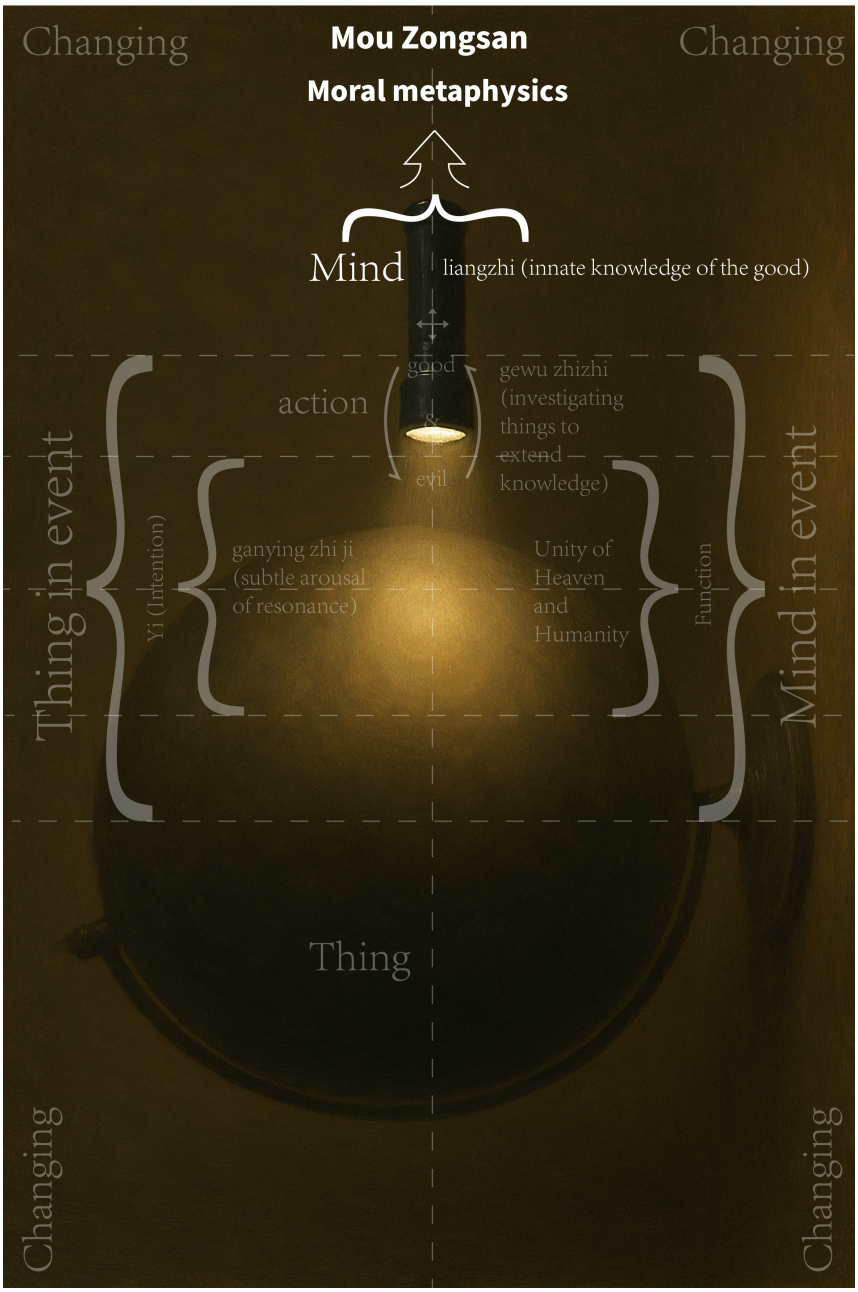

Figure 1.2: Mou Zongsan reinforcing the position of the Mind as high as moral metaphysics

Yingnian notes, Mou not only departs from Kant's logic, but also from the heart of Confucian generativity(Y. Chen, 2003).

By contrast, Wang Yangming, in preserving the vitality of the subject, also safeguards the ever-flowing, unpredictable richness of the world via the resonance of heart–mind (*xin*, 心) and thing (*wu*, 物). Even though he deliberately avoids discussing the existence of things beyond function, he does not foreclose their discussability. This section, by focusing on Wang's notion of resonance, reconstructs this generative system while highlighting the risk of over-subjectivization in Mou's reading. It reveals resonance as a fundamental mechanism of subject-object generation and philosophical structure. And yet, even now, we have not answered the fundamental question of the object. Everything still seems to return to the subject. So, under what conditions can the object enter into meaningful interaction with the subject? To explore this, we return to the most ancient *The book of change*(*YiJing*, 易经), which calls *yi-xiang* (易象). This is the origin point of image/form (*xiang*, 象) theory and modern*Xiang thinking*(象思维).

1.3.2 The Primordial Yi Xiang(易象): Heidegger's Omission?

As a key concept in Chinese philosophy, *xiang* (象, image/form) plays a crucial role in facilitating dialogue with Western thought. This conceptual position finds resonance in the writings of both Kant and Heidegger, where significant parallels and distinctions emerge. In *Kant and the Problem of Metaphysics*, Heidegger touches on a position analogous to *xiang*, as he interprets the site of convergence between the subject of consciousness and the appearing object. Kant's treatment of this convergence begins with the distinction between appearance (Erscheinung) and the thing-in-itself (Ding an sich), opening onto questions of self-manifestation and cognitive access. The image is not a mere copy but a representation and schematization of the transcendent object. Imagination is the organising force that brings the transcendent into the grasp of the subject. Heidegger elevates the image beyond epistemic function and assigns it ontological significance. First, an image is the direct givenness of the appearance of something; it is the self-showing of the being itself. Second, it is a generalised seeing—a conceptual sensualization (Versinnlichung)(Heidegger, 1997). In Heidegger's reading of Kant, imagination,

often underappreciated by Kant himself, is reinterpreted as the origin of both receptivity and spontaneity—a third faculty that grounds human knowing. For Heidegger, transcendental imagination opens the horizon wherein the meaning of Being can appear.

Within this horizon, the process of schematization—the formation of *schema-bildung*—emerges. The image in this sense is not simply appearance or imitation, but a *pure image* (*reines Bild*), a generative structure that mediates the conceptual and the sensible (Heidegger, 1997, p. 110). For Heidegger, the object of experience, as Kant described it, requires the a priori horizon created by transcendental imagination—one that holds both subject and object together. Mere appearances or representational images are insufficient for genuine experience; they lack the unifying rule or capacity to synthesise the manifold of representations (Zhang, 2008). The image, then, stands at a threshold: only through imagination can intuition and understanding be synthesised into a unified, experiential process. Thus, the image here is not an empirical picture or mental replica of an existing object, but the ontological clearing that allows Being to appear.

This imaginal field is temporal, synthetic, and interactive—it necessitates the interplay of object and imagination in a dynamic relationship. In this, it mirrors the world-forming reciprocity between human and cosmos found in *xiang* (象, image/form) thinking. Heidegger's later thought, with its sustained focus on appearing (*Erscheinen*) and phenomenality, aligns closely with our understanding of the vital generativity of *xiang*. His key concepts—*Dasein*, *Ek-sistenz*, *Lichtung* (clearing), and *Ereignis* (event of appropriation)—construct a robust framework through which appearing is no longer passive but generative (Zhang, 2008). In *Being and Time* , Heidegger defines human beings not as static entities but as *Dasein*—beings whose essence lies in their existence. *Dasein*'s existential structure—*thrownness*, *projection*, and *fallenness*—expresses its world-involvement, structured through *care* (*Sorge*). Yet human existence transcends mere immersion in everydayness. Through *Ek-sistenz* (literally "standing-out"), Heidegger reorients *Dasein* toward the truth of Being by standing within the openness (*Lichtung*) where Being can appear. This standing-out is not psychological but ontological (Heidegger, 1962).

Heidegger further radicalises this in his notion of *Ereignis*—the "event of appropriation"—a reciprocal co-belonging of Being and the human. *Ereignis* is

not a temporal happening but a primordial occurrence through which world and self disclose one another. In this evental clearing, Being is unconcealed (*aletheia*), and the human is no longer a cognitive subject but the guardian of this openness. Appearing, then, is not a mirror image or conceptual representation, but a generative process shaped by the gathering of the fourfold (*Geviert*): Earth, Sky, Mortals, and Divinities(Heidegger, 2012). Some Chinese philosophers draw analogies between the unity of Heaven and humanity and Heidegger's concept of *being-in-the-world*. The "I"is not a substantial being, but a dynamically unfolding process of world-manifestation—akin to Heidegger's *Dasein*. In *Ereignis*, the Fourfold comes into resonance, just as in Daoist cosmology the sage stands at the threshold of Heaven and Earth. Heidegger's late emphasis on language and poetry—especially *Dichtung* as the "poetic saying of the Way"—resonates strongly with the Daoist model, in which the poet-sage mediates the origin through dwelling(Zhang, 1996).

However, Wang argues that phenomenology lacks the spontaneous unity that defines *xiang* thinking. While Heidegger emphasises the originary dialogue between subject and world and views language as the "house of Being," Being still maintains a gap from saying (*Sagen*). Wang Shuren, drawing from *Zhuangzi*, critiques this separation, emphasizing instead that in *xiang* thinking, Being and expression are inseparable. *Zhuangzi*'s assertion that "I and the ten thousand things are one" affirms an ontological unity that Heidegger, in Wang's view, only approaches but never fully realizes. The root of this divergence lies in the difference between logos-based thinking and *xiang* thinking. Whereas the former relies on conceptual articulation, the latter arises from resonance and cosmological correspondence. In contrast to thinking in words (*yan si*), *xiang* thinking is directly connected to the origin and to Being(S. Wang, 2018).

One view holds that the origin of Chinese characters lies in the divinatory images of the hexagrams. There were three types of divinatory symbols: yin-yang markers, numerical symbols used for calculation, and readable Chinese characters. The emergence of Chinese characters stemmed from the need to interpret these hexagrams. This implies two things: first, a generative mode of thought; second, the original hexagrams were records of resonances between Heaven and humanity, and Chinese characters were merely annotations of these resonances. Compared to the standardised 64 hexagrams, the vast number of Chinese characters points to the richness, ambiguity, and indeterminacy of meaning derived from these primordial

signs. In this sense, Chinese characters do not weaken the connection with the *Dao*; rather, they express it in a more complex manner(S. Wang, 2018).

It is worth noting that the *Dao* does not appear as a term in the original *Zhou Yi* texts. It was Laozi who, through an act of forced naming, inserted the term *Dao* into a blank space in the original text. Here, *Dao* refers to the pre-symbolic field—the ineffable *Taiji*. The sequence from *Taiji* to yin-yang, to the eight trigrams, and then to the 64 hexagrams is not symbolic, but a movement from the formless to the formed, from pure energy (the yin-yang lines) into manifestation. In this sequence, *Taiji* is the site where *you* (being) and *wu* (non-being) intertwine—it is where "one yin, one yang"emerges as the generative moment. This site is a negativity, but not a void—it is through its emptiness that "the ten thousand things" arise(S. Wang, 2018).

Laozi's concept of *xuan* and "*xuan zhi you xuan*"(the mystery of mysteries) expresses this generative nature. "*Xuan zhi you xuan*" becomes a verb: to darken, to conceal, to begin to flow. It is the dynamic trace of the *Dao*, not merely the appearance of things or ideas. *Xiang* is this initiating movement and dynamic manifestation in process, intimately connected with the *Dao*. To understand *xiang* thinking is to understand how humans act spontaneously in unity with the world. In other words, *xiang* is the site of the emergence of existence. *Xiang* thinking is a primordial, generative mode of thought, distinct from formal logic and conceptual construction. It is not a controlling faculty, but an originary awareness that arises in the act itself, within entangled processes of becoming. It emphasises acting while perceiving, where consciousness is generated in the moment. *Xiang* thinking is non-objectifying and irreducible to concepts. It does not organise meaning—it triggers it. Like brushstrokes in cursive calligraphy or the spontaneous flourish of ink in painting, it generates meaning through the encounter with unpredictability (Zhang, 2008).

Xiang has no fixed form; each appearance is a "temporal emergence"—a flicker of awareness within living time. It is not a reflection of reality, but the generative pulse creating reality itself (Zhang, 2008). *Xiang* is not an object, but the capacity that gives rise to form—it is both the source of meaning and the force of Being. It is an irreducible, continuously emerging, holographic mode of thought—a poetic logic embedded in reason, and a deep mechanism for human creativity, sensitivity, and existence.

At this point, we begin to see a fundamentally different attitude toward experience and thought. This experiential paradigm shapes how we position things in the world. This mode of experience and thinking contains within it a profound legacy of the Chinese *ti–yong* (substance–function) non-dualism—a latent technological philosophy. The question, then, in the shift from *logos*-based thinking to *xiang* thinking (象思维), is whether such a transformation—like our critique of Mou Zongsan—is merely a displacement of Kant's epistemology into a Chinese axiology. I argue that it is not. Mou's innovation was to reframe the *Ding an sich* as a metaphysical core of Chinese thought, but in doing so, he diverged both from Kant and from Wang Yangming. Our critique reveals the differing theoretical bases of each. We affirm the objectivity of things; the difference lies not in metaphysics, but in the mode of experience and the rhythm of thinking.

Therefore, we need not directly resolve the problem of the *thing-in-itself*. Our question has always remained: how can we initiate a mode of thinking about technology?

If the reasoning above holds, then two tasks lie ahead:

1. To articulate the experiential and cognitive style of *xiang* thinking more clearly;

2. To draw out its implications for technological thought and formulate a structural proposal based on it.

1.4 Subject and Object in the Technological Milieu: Two Modes of unity of Heaven and Humanity (*tianren heyi*)

1.4.1 Unity of Heaven and Humanity (*tianren heyi*)) and the Individuation of the Subject

As a finite subject embedded within complex relational networks, the question of subjectivity remains a matter of critical importance. The Chinese philosophical notion of the unity of Heaven and Humanity (*Tian–Ren He Yi*, 天人合一) offers a valuable point of reference. Yet Confucianism and Daoism interpret this unity

from differing orientations: Confucianism conceives of Heaven aligning itself with humanity, whereas Daoism imagines humanity aligning itself with the Dao. This divergence establishes the conceptual ground for our further inquiry into the structure of subjectivity and its evolving role within the philosophical landscape.

The unity of Heaven and humanity (*Tian–Ren He Yi*, 天人合一) is one of the core concepts in Chinese philosophy, appearing across Daoism, Confucianism, Yijing studies, and Buddhist thought. It represents a dynamic cosmology that emphasises the harmonious integration between the cosmos and the human. However, this concept is far from static; its meaning varies significantly across different philosophical traditions. In Confucianism, in particular, the emphasis on "unity" tends to fall on the human side. Integration is not conceived as a passive or spontaneous merging with the cosmos, but rather as a process in which human beings consciously cultivate themselves to embody cosmic principles.

In this paper, we broadly categorize Confucianism, Wang Yangming's School of the Mind (*Xinxue*, 心学), and contemporary Neo-Confucianism under the general umbrella of Confucian thought. Wang Yangming's philosophical system emphasizes the mind as the fundamental principle (*xin ji li*, 心即理), asserting that truth and moral knowledge originate internally within the human mind rather than from external sources or empirical observation.[6] While this system demonstrates a clear reliance on the experiential subject and reveals idealist tendencies, it should not be conflated with traditional Western idealism.

Unlike Western idealism, which often asserts that consciousness constitutes the fundamental nature of reality, Wang Yangming's thought is grounded in the unity of knowledge and action (*zhi xing he yi*, 知行合一).[7] This doctrine stresses the inseparability of ethical understanding and lived practice. Ontology, therefore, is not grounded in a transcendent God or a metaphysical realm as the source of being, but rather in the subject's innate moral knowledge (*liangzhi*, 良知)—a form of ethical perception.[8]

[6]The School of the Mind (*Xinxue*, 心学) claims that the mind itself is the principle; moral truths are not imposed from without but arise innately within.

[7]*Zhi xing he yi* (知行合一) maintains that moral knowledge and moral action are inseparable; to know the good is necessarily to act upon it.

[8]*Liangzhi* (良知) refers to the innate moral conscience present within all people. For Wang, moral cultivation is not about acquiring ethical truths externally, but about rediscovering and

From the perspective of contemporary New Confucianism, which seeks to reinterpret classical Chinese thought within the framework of modern discourse, the Western epistemological model—where the subject relentlessly advances toward the object—is neither regarded as the exclusive mode of cognition nor as its ultimate telos. The contemporary Neo-Confucian philosopher Thomé H. Fang (1899–1977) identified the concept of *sheng sheng* (生生), found in the *Yijing* (I Ching), as the core and driving force of Chinese metaphysical thought. The term *sheng sheng* literally means "generation and regeneration," and signifies a continuous, dynamic process of becoming. To articulate this idea in modern philosophical terms, Fang borrowed Alfred North Whitehead's notion of "the creativity of creativity."He writes: Infinite life originates from a primordial creativity that transcends infinity. All finite forms of life converge toward an ultimate infinite outcome, existing within a continuous process of transformation—an endless cycle of the dynamics of *qi*. The Way of Heaven perpetually creates and advances, with life surging forth through the form of primordial creativity. The intrinsic goodness of this form surpasses all relative values (Fang and Kuang, 2009, p. 85).

This vision of continuous generativity stands in contrast to linear or teleological epistemologies. Rather than positing a metaphysical divide between subject and object, Fang's reading of *sheng sheng* emphasises the ontological entwinement of all beings within the ever-emergent flow of life and transformation. In contemporary Neo-Confucianism, particularly in the thought of Xiong Shili, creativity is no longer treated as an abstract metaphysical principle detached from human experience. Rather, it is integrated into the existential structure of the subject itself. With remarkable philosophical acuity, Xiong incorporates the concept of creativity into the dynamic process of *xi-pi* (contraction and expansion) as described in the *Yijing* (I Ching), attributing creativity to the ultimate consciousness of the cosmos, identified with the expansive force (*pi*)(Xiong, 2009).

This expansive vitality permeates all levels of existence—matter, plants, animals, and human beings—and ultimately manifests as mind in its highest form. In Xiong's framework, this cosmic creativity is not external to the subject; it is actualised through human existential activity. It constitutes a form of "existential ontology" that stands apart from speculative metaphysical or logical systems. For

acting upon this intuitive inner knowing.

Xiong, being and creativity are not independent abstractions but are unified within the moral and spiritual life of the human subject. The "heart of the universe"(*yuzhou zhi xin*, 宇宙之心), as the source of expansive vitality, is posited as an ultimate principle that resists rational reduction and conceptual dissection. Rather than dissolving into an unknowable metaphysical abstraction, this primordial creativity returns to and is concretely realised in the living subject. It affirms a profound ontological unity between human existence and cosmic becoming(Xiong, 2009).

In Confucianism, *tianren heyi* (the unity of Heaven and humanity) entails an ethical responsibility embedded within the structure of the cosmos. This unity is not a given, but must be actualised through a concrete process of moral cultivation —namely: self-cultivation, regulation of the family, governance of the state, and ultimately the pacification of the world (*xiushen, qijia, zhiguo, pingtianxia*, 修身、齐家、治国、平天下). Through this progressive moral praxis, the individual comes into alignment with the Way of Heaven (*Tiandao*, 天道), not by metaphysical fusion, but through the intuitive apprehension and embodied enactment of cosmic principles. The Confucian realisation of unity thus emphasises ethical interiority and social responsibility as the paths to cosmological resonance.

As previously discussed, the Confucian path toward unity with the *Tiandao* (Way of Heaven) often shifts—particularly in key modern thinkers—toward a subject-centred interpretation under the discourse of generativity. In the cases of Wang Yangming and Mou Zongsan, this movement may be understood as a latent slippage toward subjectivization. Wang Yangming's emphasis on *liangzhi* (innate moral knowing) and Mou's reinterpretation of *zhihui zhijue* (intellectual intuition) both relocate the generative source of moral order within the interiority of the experiential subject. This tendency becomes even more pronounced in the thought of Xiong Shili, who incorporates elements of Yogācāra (Consciousness-Only, 唯识论) into his metaphysical system. Within Xiong's hierarchical cosmology, the expansive consciousness of the cosmos is ultimately unified with the highest stratum of human consciousness. While this synthesis is presented as ontological coherence, it simultaneously risks reinforcing a subtle anthropocentrism—where the cosmos is interpreted through the structure of the human mind—and a potentially over-subjectivised vision of cosmic order (Xiong, 2020).

1.4.2 Unity with the Dao: Toward a Structural Unity

Chinese philosophers have developed a distinctive understanding of the essence of the world; yet, their modes of expression often lack the rigorous logical structuring and systematic formulation characteristic of Western metaphysics. In this context, the work of Heinrich Rombach emerges as uniquely original. Compared to Martin Heidegger, Rombach arguably moves even closer to the spirit of Eastern thought. More significantly, he departs decisively from the binary opposition between subject and world that continues to structure much of Western ontology(J. Wang, 2011). Rombach's structural ontology offers a conceptual path toward the unity of Heaven and humanity (*tianren heyi*, 天人合一), but without grounding this unity in Confucian ethical cultivation. Instead, his thinking establishes a profound resonance with the philosophical logic of the Dao—a mode of thought that privileges generative relationality over fixed identity, and unfolding structure over substance.

In Rombach's structural ontology, the essence of things is neither isolated nor self-contained. The subject's experience is not an objectifying apprehension of discrete entities, but a structural mode of awareness—an immediate perception of the tensional relations among things. At the outset of his *Strukturontologie*, Rombach introduces the Dao as a guiding philosophical image, drawing on Laozi's metaphors of the wheel and the vessel. The wheel turns not because of the wood, but because of the emptiness (*Leere*) at its centre; the vessel holds not because of the clay, but because of the hollowness within. From these images, Rombach concludes that the essence of existence does not reside in concrete, substantial entities, but in the tension-structured relational ordering (*strukturale Zuordnung*) made possible through emptiness (*Nichts*). (Rombach, 2015b, pp. 11–12)In this view, Being is not substance but structure, not presence but relational tension, and emptiness is not a lack, but the generative condition for coherence and form. Rombach's reading thus resonates deeply with Daoist cosmology, where the void (无, *wu*) serves as the origin of all emergence. This "nothingness" is not a passive void, but an active structural centre that facilitates mutual attraction and pre-orientation among beings. Emptiness, in this view, is not a lack but a source of generative dynamism —it is the very potentiality that enables relation and structure to emerge (Rombach and J. Wang, n.d. Pp. 264–267).

When confronted with the unknown, Western philosophy—shaped by logos-

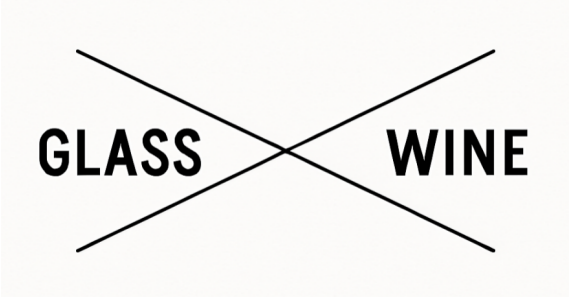

Figure 1.3: Wine and glasses together form a structure.

thinking—tends to approach it through definition, rational analysis, and epistemological accumulation, aiming ultimately to subsume the unknown into a coherent system of knowledge. This tendency has fueled the rise of Western science and its epistemic architectures. In contrast, the path opened by the Dao (*Weg*) does not operate through the categorical apprehension of entities, but through the cultivation of structural experience. This orientation aligns closely with the *xiang*-based mode of knowing discussed earlier, wherein meaning emerges not through conceptual abstraction but through resonant correspondence and relational unfolding. Consider the example of a wine glass: its "essence" does not lie in its material, shape, or intrinsic form, but in its relational orientation toward wine. It is not a wine glass by virtue of any inherent property, but through its functional correlation, as a vessel for wine. Once separated from wine, it loses its centre of significance and becomes conceptually unintelligible outside the relational structure that confers its meaning. This illustrates that the essence of a thing is not something it autonomously possesses, but rather something that emerges through its structural positioning within a specific field of relations. Being, in this view, is not substance but relation —defined not by isolated identity, but by situated functionality(Rombach, 2015a, pp. 11–12)

In this sense, essence is not a fixed attribute but a dynamic structural configuration that enables something to be understood as what it is within a given relational frame. This perspective overturns the traditional notion of essence as a self-enclosed identity, emphasising instead that a thing becomes what it is only through its relations to other things. Essence, then, is not a static substance but a pre-structured field—an open, generative site in which being comes into articulation. It is within this dynamic field of relations that entities gain intelligibility, not

through isolated presence, but through structural embeddedness and functional orientation (Rombach, 2015a).

In doing so, Rombach moves beyond Heidegger's existential ontology. In *Being and Time*, Heidegger locates the disclosure of being within *Dasein*, interpreting entities primarily as tools (*Zeug*) embedded within the existential structure of care (*Sorge*). The meaning of things (*Bedeutsamkeit*) depends on human engagement, and their being is constituted through being-in-the-world (*In-der-Welt-Sein*). While Heidegger decisively breaks with Cartesian dualism, Rombach argues that he nevertheless retains an implicit anthropocentrism—a "centre of meaning"(*Zentrum des Sinns*) that continues to orient all being toward the human subject. Rombach seeks to decentralise this orientation by grounding meaning not in human intentionality, but in structural relations that precede and exceed the subject(Rombach and J. Wang, n.d. Pp. 15–18). At this point, Rombach's critique resonates with Wang Shuren's observation that Heidegger's Dasein lacks the non-dual, cosmologically embedded self-awareness of xiang thinking(S. Wang, 2018). In contrast, Rombach completely dismantles anthropocentrism. In his Structural Ontology, both humans and things are co-generative within a field of generative tension (Spannungsfeld der Genesis). Humans unfold through reflexive self-positioning; things unfold through their natural tensional function (Rombach, 2015a).

A vessel exists not because of its material, but because its hollowness provides the functional tension of containment. Similarly, language is not a subjective expression but a field of semantic tension that unfolds relationally. Meaning is not imposed by the will, but generated through the dynamic tension of interaction. In Rombach's Structural Phenomenology, the relationship between humans and things is not subject-object dualism or instrumental use, but a mode of co-creation, co-generation and mutual unfolding. The world is neither a domain mastered by humanity nor a neutral aggregate of entities. It is a generative web, woven from the dynamic tensions among all existents. In this view, Rombach not only transcends metaphysical dualism but also Heidegger's Dasein-centred ontology. Being is tensional emergence, and the world is structure-unfolding.

For Rombach, the fundamental logic of existence is not identity, but tension-generation and relational unfolding. Relations are not appended post hoc to already-formed entities; rather, they constitute the originary movement of being itself. Every structure is intrinsically self-restructuring through accumulated tension,

breakthrough, unfolding, and self-correction. Existence is not allocated within a fixed system; it emerges within its field of tension as a dynamic, generative process. Here, structure is not mechanical form, but a living movement arising from relationality. At its core lies Konkretisierung—not as an externally imposed form but as self-gathering within tension fields. Beings emerge where local tensions intensify into constellations—temporary nodes of stability that never fully close. Each concretisation is both a gathering and an opening: stabilisation always breeds new differentiation. Existence is not a sequence of fixed entities, but a continuous, open-ended process of self-concretisation.

As Rombach writes:

> "Each formation is already the beginning of a new field of tensions; no localisation ever achieves final closure." (Rombach, 2015a, p. 25)

This logic applies equally to natural forms, social relations, and cultural artefacts. Poetry, ethics, technology, and relationships are all tensional unfoldings, not fixed units. Within Structural Ontology, the essence of being lies not in self-sufficiency, but in the network of tensions that co-constitute it. Every being is a site of opening to the other and participates in bidirectional attraction. Each act of existence is a structural event of generation. The subject is no longer an isolated epistemic center, nor a functionalized cog in a technological system. It is a transient node, arising naturally within a field of relations—a momentary condensation of meaning and existence. The subject does not descend from abstract essence into material form, but emerges through tension: through difference, struggle, coordination, and recombination. It is a crystallisation within the structural flow —a localised pulse in the continuous unfolding of being. Moreover, processes of appearance and unconcealment show that being does not retreat into hiddenness, but discloses itself through tensional movement and generative activity. The subject, as a focal point of structural unfolding, is not enclosed, but essentially open, dynamic, and becoming. This understanding directly challenges the logic of modern technological systems. Such systems demand fixed, predictable, and functionalized subjects—yet a structurally generated subject is inherently fluid, incomplete, and free. Where systems demand control, the subject carries within it the irreducible potential of transformation(Rombach, 2015a).

True freedom, in this view, is not domination over the world, but becoming a

new node in the generative process of world-making. The subject's freedom lies in openness within relation, not withdrawal from technology, nor reactive resistance. Indeed, within this framework, humans and things alike may be subjects—to the extent that they condense a centre of tension and unfold their generative capacity within the web of relations. Subjectivity is no longer defined by will or ownership but by resonance with becoming. We adopt Rombach's Structural Ontology as a framework to integrate the Daoist version of tianren heyi (the unity of Heaven and humanity). This move may understandably provoke criticism, as it is not a line of thought that emerges entirely from within Chinese philosophy itself. However, before the appearance of a more original indigenous theory, Structural Ontology does not contradict the epistemology of xiang-thinking, and in many areas, the two mutually resonate. Furthermore, as far as Rombach himself is concerned, he opens up a direction of scientific reflection that differs from the logic-centred paradigm of logos-thinking. Therefore, following this line of thought, I will proceed to discuss xiang thinking as a structurally unfolding mode, and on the other hand, to explore it as a metacognitive form of technological thinking.

1.5 On the Technological Potential of Structural Thinking and *Xiang-Thinking*

1.5.1 A technical dialogue with Yuk Hui

Yuk Hui is a thinker who moves across technology, economics, aesthetics, and philosophy in parallel, unveiling the essence of the contemporary technological condition: it is about control, about data feedback and behavioural prediction, and more profoundly, about the systemic interweaving of perception, psychology, economy, and culture in processes of cultivation and fundamental rewriting. In this perfected era of control, Yuk Hui presents a counter-possibility: a future of anti-control, where "contingency" arises within the systems. Through ontological forces of difference, asynchrony, and eventually, such systems may rupture their loops of self-renewal and convergence, allowing for the regeneration of perception and the world. I may be excavating Heinrich Rombach's thought with the same technical thoughts in this research, but it begins from a fundamentally different stance: one

rooted in "relational ontology" and "structural ontology." He does not search for gaps within systems but demonstrates that existence is essentially relational and that the relation is fundamentally structural. He does not regard technology merely as a tool of efficiency but as a basic "network of observation." Observation possesses intrinsic structure; it is a structural network constantly abstracted, analysed, and constructed through observation. Rombach's notion of structural freedom is not marked by sudden rupture but by a continual generation, renewal, and elevation of structure within relations and appearances. Its freedom lies in self-manifesting openness and the tendency toward self-transcendence (Rombach, 2015a).

Yuk Hui's philosophy of technology focuses on how technology, in real systems, reconstructs human perception, behaviour, psyche, society, and futurity. He does not see technology as a finite supplement but as a network of connections, control mechanisms, and perceptual apparatus. Rather than viewing technology as a functional optimisation apparatus, Yuk Hui approaches it as a recursive structure that re-enters and reorganises the conditions of its emergence. In this sense, recursion does not imply mechanical repetition or functional automation but a logic of return, where each iteration introduces qualitative shifts and contingent bifurcations (Hui, 2019a). While contemporary technological systems tend toward generalisation—integrating perception, control, prediction, and self-adjustment into seemingly closed feedback circuits—Yuk Hui does not embrace this generalising trend as an achievement. Instead, he interrogates how these structures, in their very operation, expose moments of discontinuity and transformation. What appears as total integration also contains points of delay, difference, and disruption—sites where the recursive movement of technology opens to contingency. Furthermore, these recursive systems are not neutral or purely technical; they are deeply entangled with socio-political and ontological conditions, and it is through this entanglement that generative fissures begin to emerge (Lovink, 2019). Within such relatively controllable systems, Yuk Hui searches for elements of the "unforeseeable," the "asynchronous," and the "differential." Here, "contingency" is not traditional randomness, but the emergence of "the new" that cannot be pre-synchronised or fully datafied by the system. Building on this, Yuk Hui unfolds a rigorous ontological vision of recursive structures, in which contingency operates not outside but within the system's generative dynamics. Drawing from Schelling's Naturphilosophie and Whitehead's process metaphysics, Hui argues that recursivity—far from being

merely a functional feedback loop—is the ontological condition for individuation and novelty. Through recursive systems, beings unfold their form, but always under the potential interruption or modulation of contingent events. Rather than viewing systems as fixed mechanisms, Hui explores how recursive structures modulate themselves across multiple registers. He identifies three interrelated modes of recursion: the organic, the organological, and the cosmotechnical. The organic refers to the model of living systems where feedback and growth are structured around self-maintaining loops; the organological refers to the exteriorization of human faculties into tools and technologies, which then recursively reshape human perception and cognition; and the cosmotechnical relates to the embedding of such recursive relations within diverse cosmologies, allowing for locally situated and philosophically pluralistic forms of technics.

Crucially, within these layered recursions, contingency is not a disruption from outside the system, but a constitutive fissure within the recursive unfolding itself. Each recursive closure—each act of systemic self-cohesion—contains the potential for a fissure, an unexpected event that exposes the system's non-totalizability. This moment of the unexpected is eventual emergence: a formation of meaning, relation, or structure that exceeds the system's prior logic and escapes preemption or rational forecast. The "event" thus manifests as a synaptic break within recursive temporality, revealing that systems are always open to future transformations. Hui displaces the classical metaphysical opposition between being and becoming in this framework. Recursion is not a compromise between the two, but a generative plane that makes both possible. Far from being self-enclosed, systems are recursive yet porous—exhibiting tendencies toward optimisation and closure, but always retaining the possibility of renewal through internal asymmetry, desynchronization, and contingency. As such, recursive systems are not deterministic totalities, but unfolding ontological fields shaped by feedback, accident, and interaction. By foregrounding this ontological tension between recursivity and contingency, Hui lays the groundwork for a technology philosophy that resists control logic and naïve vitalism. Freedom arises not through negating systems but by identifying within them the structural openness to what exceeds them—the "chance" that forms new lines of individuation, new figures of relation, and new sociotechnical paths. This dialectic of recursive regularity and contingent rupture forms the core of Hui's generative ontology. Recursivity is a logic of control—perpetually

optimising, converging, and reorganising. However, Yuk Hui identifies moments of unpredictable mutation that cannot be pre-scripted within its dynamics. These moments of "contingency" form the generative fissures of new emergence. This is a path to discovering non-control within control, to releasing latent generativity from within systems themselves. At this ontological-generative level, his work begins to resonate with Structural Ontology(Hui, 2019a).

1.5.2 Relationality and Structural Freedom: How Rombach Discerns Generativity Through the Openness of Structure

If Yuk Hui seeks the non-systemic within systems and contingency within recursion, then Heinrich Rombach, from the very outset, stands on the vantage point of structural generation, understanding "freedom" as the immanent activity of structure itself. His Structural Ontology (Strukturontologie) does not add a network of relations on top of pre-existing entities but treats "relation" as the very condition of being. More importantly, he reveals that structure is not a machine that restricts freedom, but rather the dynamic mode through which freedom manifests (J. Wang, 2011). In works such as Phenomenology of Structure and A Phenomenology of Freedom, Rombach conceives of being as a continuously generative relational structure, rather than a self-sufficient entity. The world is not graspable through a hidden metaphysical substratum but through the active process of structural emergence itself. Structure, in this sense, is a mode of appearance of relations, not a static form but a tension-laden, self-transcending generative process that unfolds in time.

Within this framework, freedom is no longer external to structure—as subjective will or arbitrary decision—but embedded in the structural impetus to unfold. Structure is not rigid or closed; rather, it is an open system marked by hierarchical distribution, rhythmical differentiation, generative disparity, and latent potentiality. For Rombach, freedom is expressed as the structural capacity to exceed predetermined rules and orders. As he describes in his treatment of the ascending structure, freedom is not choosing between already formalised options (e.g., A or B), but in generating a new, unanticipated option C from within the structure itself—an option not previously formalised, but dynamically emerging

from the inner tensions of the structure. This "self-transcendence within structure" constitutes the ontological basis of freedom in Rombach's thought. Rombach emphasises that structure is dynamic—it exists not as a static substance but as a directional generative unfolding in time. Its dynamism is not limited to transformation but includes the emergence of new layers, styles, rhythms, and semantic units. Generativity means more than internal updates—it entails the ascending movement: the capacity to internally reconfigure and leap to higher orders of organisation. This is not a quantitative accumulation, but a qualitative mutation —a structural reformation triggered by tension. Several mechanisms enable this ascent: rhythmic differentiation, where asynchronous rhythms between structural elements generate tension fields; tensional displacement, where redistributed or compressed internal tensions destabilize equilibrium and catalyze transformation; semantic differentiation, where changes in meaning units reorganize the structural schema of appearance; and individualization tendencies, in which components acquire distinct functional positions, producing differentiated structural profiles.

These mechanisms lead to the organisation of appearance: structure does not wait for a subject to activate it, but generates perceptual forms that constitute the world's phenomenal configuration. As Rombach writes, structure "gives the world its appearance in the course of its unfolding"—not merely showing "something,"but actively organising how things may appear. The event of appearance is not static but structural, rhythmic, and relational—each moment of appearing becomes a leap in the hierarchy of structural formation (Rombach, 2015a). This structural dynamism resonates with Yuk Hui's notion of "contingency" within recursive control systems—namely, the exposure of fissures and ruptures within optimised feedback loops. Yet where Hui focuses on desynchronization, latency, and unpredictability as resistance within closed technical systems, Rombach identifies freedom as the result of the structure's internal dynamics. His concept of ascending structure emphasises that freedom arises not from external disruption but from internally generated asymmetry, reorganisation, and tension-driven reformulation.

While Hui's "contingency" reflects unexpected breaks within recursive control, Rombach's "generativity" arises from structural self-transcendence. Hui emphasises systemic rupture—unscripted deviations from closed computational control; Rombach focuses on structural ascent—the internal genesis of new relational orders. Both thinkers affirm that freedom arises not from intervention but from the system or

structure intrinsic instability. Hui calls it "contingency within recursion"; Rombach, "transcendence within structure."Each offers a distinct mode for conceiving how freedom may emerge from within predetermined conditions, whether by highlighting ruptural moments of desynchronization or tracing generative movements of internal organisation.

For Rombach, freedom does not arise by negating or escaping structure but by actualising the generative movement immanent to structure itself. It is not that structure permits space for choice, but that structure is the very form in which freedom expresses itself, through its inherent tendency toward self-reconfiguration. This potentiality lies not outside, but within the shifting rhythms, semantic alignments, and structural tensions. Hence, structural freedom is not the post hoc ability to select among choices but the synchronous emergence of new possibilities in relational motion. It does not require a sovereign will but is activated through dislocation, friction, and embedded interaction. Structural freedom is not a rupture from above but an emergent co-generativity within (Rombach and J. Wang, n.d.).

When structure encounters internal accumulations of tension—whether informational overload, rhythmic misalignment, or logical conflict—it does not collapse but transforms. It generates new structural linkages, reorganises semantic pathways, and opens unforeseen possibilities. Thus, freedom is not merely the capacity to "do something,"but to "generate a new structural logic."Structure becomes the formal condition of freedom, not by granting external space to the subject, but by unfolding possibilities within itself. Freedom expresses itself not as an accident, but as a persistent potential embedded within the dynamic logic of being.

1.5.3 *Xiang* as Resonance in Structural Ontology

In structural ontology, wherever there is structure, the first thing that occurs is appearing (*Erscheinen*): not a mere outward showing, but the first perceptible trace of structural significance in action—moments in which the various "moments" mutually determine one another and become each other's conditions, so that "there is" comes to hold in a relational way. Yet appearing alone is not enough. The grammar of existence is better captured not by "it is" (*ist*), but by "there is / is given" (*es gibt*). This leads to the second step, giving (*Gebung*): a relational whole takes some object–information as datum (*Datum*) into its own patterning; in

the process of giving, the moments are established, order is arranged, and meaning is not a belated interpretation but part of the very act of giving—meaning and datum are "given" together, jointly composing the present form of reality. When the object-side of donation and the meaning-side of organization intensify together and support one another, the third step, rising (*Aufgang*), occurs: thing and meaning disclose and "lift" themselves within a field of tension, condensing into a new structural configuration. Every formation is only a provisional stabilization that simultaneously opens a new field of tensions; generation therefore never closes.(Rombach, 2015a)

Accordingly, "reality" is not a fixed property but a graded effect: it is measured by the degree of embeddedness in a web of relations, by the load-bearing and self-regulating capacity under disturbance, and by the potential to continue organizing meaning—the more an entity can maintain relations and reorganize amid conflict and imbalance, the more "real" it is. Along this chain, "subject" and "object" are not pre-given centers, but temporarily active–receptive nodes within a network of tensions: knowing is not the possession of a static thing, but participation in the generation of appearing–giving–rising. The methodological shift that follows is a move from "definition–classification–causal chain" to "relation–tension–genesis," treating concepts, schemata, narratives, and instruments as devices of unconcealment, and assessing them by whether they increase the world's accessibility and generative power—i.e., whether they found more relations, amplify meaning and datum together, and keep formation as an open process of rising. Only then have we truly increased "reality."

Xiang is the *Dao*'s trace and the medium of generation—an order that organizes resonance within what cannot be fully said. Within the horizon of structural ontology, *xiang* can be stated more precisely. Return to Wang Yangming's line, "When you come to look at this flower, the flower's colors become clear at once."(J. Wang, 2011) This sentence names exactly the resonant field and incipient trigger discussed earlier, and it can be unfolded with structural ontology. Here "become clear" is not the self-display of an inner property of the object, but a structural event: within the tension field of "I, this flower, and this situation," attention and intention ignite the generation of *xiang* and the unfolding of structure. The process can be described in three moments: appearing, givenness, and rising.

Appearing—"coming to look at this flower"—draws an as-yet unformed zone of

experience into relation. Attention acts as an incipient cue, setting the tension field in motion. "This flower, its color, this moment" is grasped as a relational moment rather than an isolated element. Its "there-ness" is established as a position within a web of relations. Color first appears, in action, as a sensible trace of *xiang*, a directional tendency or interface that marks possible paths of further linkage and organization. Appearing alone is not enough. What follows is givenness: light, background, perspective, posture, memory, and linguistic categories are organized synchronically into a single pattern in which data and meaning are given together. Thus the "clarity" of color is not raw data later explained; datum and meaning arrive as one. In structural terms, *xiang* here serves as a pre-structure or assignable relational slot. When "my viewing" and "the flower's features" enter this slot, the relation completes, an interface takes shape, and color's clarity is established as the local mode of reality here and now.

When givenness on the object side and organization on the meaning side reinforce each other, the structure undergoes a level shift, rising. My discrimination of hue, texture, and freshness deepens. Possible courses of action (pausing, smelling, framing, speaking) open. Affective and evaluative tones (appreciation, pity, care) join the same field. The structure thus gains greater structural freedom: it keeps relations and keeps generating under changes of angle or light, and at the same time, it opens new tensions and connections, new attention, associations, and practices. This is the rising effect of "becoming clear." In summary, "the flower's colors become clear at once" condenses to the following sequence in words: a *xiang*-trigger in appearing, a joint givenness of datum and meaning, and a tension-tuned rise to a higher level. Along this chain, "subject" and "object" are not preset centers, but temporary, responsive nodes within a network of tension. Knowing is not the possession of a fixed thing; it is participation in structural generation. "Becoming clear" does not uncover a ready-made essence; it brings a latent structure into a presence that is sensible, continuous, and capable of ascent. In this way, Wang Yangming's "co-generation of mind and thing" resonates with structural ontology's logic of relation, tension, and generation.

1.5.3.1 The Primordial Nature of Xiang and Xiang-Thinking: Resonances with the Generative Logic of Structural Unfolding

According to interpretations by scholars such as Wang Shuren, *xiang* (象) is not merely an image or a symbol, but a trace of the *Dao*—a mediator of becoming, a pure signifier, and a resonant order that emerges within the ineffable.(S. Wang, 2018) This notion can be further clarified by comparing it to the triadic unfolding described by Heinrich Rombach in Chapter 2 of *Strukturontologie*—namely, *Erscheinen* (appearance), *Aufscheinen* (shining forth), and *Sein* (being)(Rombach, 2015a, pp. 131–139). Rombach understands "appearance"(*Erscheinen*) not as visual emergence but as the first moment of structural significance becoming perceptible in action. It is the initial event in which a structure appears as experience. "Shining forth"(*Aufscheinen*) refers to the activation of a structural tension in experience—a radiant call of being that illuminates a hidden order. "Being"(*Sein*), then, is neither a metaphysical presence nor a given substance, but the field of generative energy through which structure unfolds(Rombach, 2015a, p. 133).

Xiang-thinking (象思维) lies precisely at the intersection of these threefold processes. *Xiang* is not a static object of appearance, but the dynamic tendency of appearing. (Zhang, 2008)It is the verbal unfolding of *Aufscheinen*, not a fixed representation but a becoming—an emergent trajectory within lived experience. *Xiang* is thus the immediate trace left by the act of existence in its unfolding. Crucially, *xiang* is a guide of generative action, not simply the product of unveiling. Before structure becomes visible, *xiang* summons and redirects perception and behaviour. When encountering an indeterminate experiential field, one is often guided by the affective cue of *xiang* into responsive transformation(Zhang, 2008). In this sense, *xiang* possesses an efficacy—an anticipatory form that influences judgment and action before formal articulation of structure. *Xiang* is both a trace and a trigger form while simultaneously prompting behavioural engagement. It is not a conceptual representation but a directional tension guiding structural genesis (Tiandao, 2010).

The formation of *xiang* does not occur outside of experience, but arises organically within fields of tension and relation. *Cheng xiang* (成象)—"becoming image"—is not an act of naming but the initial sensuous articulation of generative form. It is the first perceptual layer of structural emergence, before objectification

or conceptualisation*Xiang-thinking* is thus a mode of resonance with structure, enabling attunement through unfolding, rather than distancing through observation (Zhang, 1998). Furthermore, *xiang* is neither object nor subjective illusion—it is the immediate manifestation of generative order. It is what Rombach would describe as "the sensuous form of being unveiled in rising"(*Aufgang*). It is the image that arises spontaneously at the intersection of structural tension and free action. *Xiang* is not derived from a predetermined form but emerges dynamically in behaviour. It responds to deep structural calls while remaining conditioned by immediate action. It is both the emergent shape and the initiator of the response.

This generativity places *xiang* in a permanent state of incompletion. It is not final, nor arbitrary—it is always becoming. Its openness to transformation ensures that it never repeats itself, never closes. *Xiang-thinking* is a mode of responsiveness-in-doing—akin to Rombach's assertion that "existence is rising"and "action is unveiling."(Rombach, 2015a, pp. 192–200) The *Yizhuan* (《易传》) outlines a cosmological unfolding—from the formless *Taiji* to *Liangyi*, *Sixiang*, *Bagua*, and the sixty-four hexagrams. This is not a symbolic calculation but the generative path from the unnamable (*xuan*, 玄) to form (*xiang*, 象). This resonates with Rombach's notion that *Aufgang*—structure is not assembled from parts but emerges from tension, openness, and action. *Xiang* likewise appears relationally and temporally —it is a "thing in formation."(Rombach, 2015a, pp. 131–137)

We outlines four essential features of *Aufgang* (rising):

1. **Non-Assemblability**: Rising is not the result of assembling parts, but a holistic event of emergence from a tension field.

2. **Tension-Induced**: The driving force is not purpose but tension—conflict, imbalance, or rupture within a relation.

3. **Experiential Openness**: Structural emergence only occurs if experience remains open, sensitive to indeterminacy and affective engagement.

4. **Temporality and Relationality**: Rising unfolds in time and through relationships. It is never instantaneous but a situated dynamic process.

Thus, both *cheng xiang* (成象) and *Aufgang* describe irreducible generative events. *Xiang* is the first emergence of meaning; structural rising is the first

shaping of being. Both emphasise process, openness, and ontological non-reducibility(Rombach, 2015a, pp. 98–110).

Xiang-thinking demands that meaning be generated through experience. Rombach likewise sees structure not as mechanical but as a *free act*—a dynamic organisation of unity under tension. In *xiang-thinking*, the *xiang* is not imposed but arises through responsive resonance with the world. It is not a product of cognition but a form reality assumes in its very becoming.

1.5.3.2 The creativity of Xiang-Thinking and the Freedom of Structure

Rombach proposes that the "ascent"(Aufstieg) of structure is expressed in its degree of internal freedom—that is, its capacity to integrate complexity, manage heterogeneity, respond to conflict, and generate new relational forms. (Rombach, 2015a, pp. 266–278)Structural freedom, in this view, serves as a key indicator of structural quality: the more a structure can endure external disturbances without disintegrating, and the more it can reorganise itself in response, the more it demonstrates a generative orientation. A structure is not "strong"because it is closed, but because it is capable of transformation—it ascends by virtue of its generative power.

Likewise, *xiang* (象) possesses this internal freedom. It is not constrained by conceptual schemes or bound by deductive logic; rather, it "emerges from indeterminacy."Xiang-thinking never seeks certainty, but instead responds to the unsettled, the unformed, and the unspeakable—generating new configurations of appearance through resonant interaction. Xiang does not "represent"a preexisting meaning; it is the very point of ignition where meaning arises—a fragment of the world surfacing from difference and incoherence (S. Wang, 2018).

The freedom of *xiang* lies in its capacity to resonate with the world's complexity without reducing, compressing, or conceptualising it. It is always in the process of becoming and cannot be captured by fixed systems. Just as structure must "arise through tension,"xiang must "take shape through flow."Its high degree of freedom makes Xiang a vital bridge between generative action and the unfolding of existence. It marks the first affective trace of meaning, a sensuous prelude to structural emergence (S. Wang, 2018).

Xiang-thinking resists formal fixation, insisting instead on temporal generation

—a notion entirely aligned with structural ontology's assertion that structure is not a substance but an unfolding process. Xiang always captures meaning "in the flash of emergence,"a momentary manifestation of reality, still on its way, not yet named or categorised(Zhang, 2008). Likewise, Rombach's concept of structural action grows through uncertainty and adjusts within the unknown (Rombach, 2015a).

This implies that *xiang-thinking* is a form of primordial thinking, rather than objectifying reflection. It does not derive meaning through observation and induction, but directly generates meaning within the lived tension of experience. As Rombach articulates through his concept of ecstasy (*Ekstase*), the subject, when immersed in deep engagement, no longer acts as a centre of control and analysis but becomes a conduit for the emergence of structure. This state of self-forgetting is not an obstacle to structure—it is its condition of possibility(Rombach, 2015a, p. 209).

xiang-thinking corresponds closely with this insight. It emphasises a posture of ecstasy for the sake of *xiang*—a generative attitude in which the individual, in the midst of experiential flow, tension activation, and behavioural unfolding, fuses with the structural dynamics of the world, attunes to its rhythm, and resonates with its energetic tendencies. Xiang emerges not through subjective projection but in the retreat of the self, making space for appearance to rise. The lack of subject-object division is not chaos but a relationally open field—a domain where structural action is actively underway(Rombach, 2015a, p. 210).

Thus, in *xiang-thinking*, the "I"is not a knowing subject but a sensitive node within a field of generativity—a medium that participates in structural tension. Meaning is not an object grasped by the subject, but a resonant emergence within. Xiang-thinking shows us that action not only conveys meaning—it generates it; structure not only embeds within experience—it self-unfolds in and through action(Rombach, 2015a).

1.5.3.3 The Non-Logicality of Xiang and Structural Ontology's Transcendence of Formal Logic

Structural ontology seeks to free itself from the constraints of traditional formal logic, especially from cognitive frameworks that reduce being to static entities and organise experience into rule-based chains. It advocates a fundamental shift: from predefined definitions to generative unfolding, from external classification to internal

tension integration, from static logical deduction to structural emergence through action. Within this logic of structural movement, the classical laws of formal logic—such as the law of non-contradiction and the law of the excluded middle—lose their universal authority. As Rombach emphasises, structural generation arises precisely from the interplay of tension, conflict, and disequilibrium (Rombach, 2015a, pp. 3–47).

Xiang (象), by its very nature, evades the dominion of formal logic.(Zhang, 2008) It is not a concept; it relies on no fixed definitions. It is not a proposition; it requires no truth-value verification. It is not a unit of binary judgment under the law of the excluded middle ("either/or"), but rather a form that emerges in ambiguity, indeterminacy, and openness. It does not depend on chains of inference but on affective tension. It does not pursue consistency but generativity (S. Wang, 2018). It does not seek a conclusion but focuses on the process of emergence. In this sense, Xiang-thinking offers the most distinctly Eastern form of cognition corresponding to structural ontology. *Xiang* is not the application of categories but a dynamic, living system of relationality. It cannot be repeated, but it can be responded to. Within structural ontology, a valid structural action is not one that is logically self-consistent but one that bears generative and integrative power. *Xiang* and *Xiang-thinking* are thus the Eastern embodiment of this principle. Much like the Daoist or artistic notion of "accidental mastery"[9] *Xiang-thinking* resonates with the concept of "creative structural behaviour" from an Eastern perspective(Zong, 1981). The phrase describes a moment in artistic practice—especially in ink painting or calligraphy—when, without calculation or intent, an inspired form suddenly arises. The brush follows the movement of qi; the image forms naturally. This is not the result of deliberate planning but a spontaneous emergence from the confluence of experience, technique, sensitivity, tension, and mental atmosphere. In structural ontology, "accidental mastery" signifies a moment of uncontrolled generation: structure is not assembled from a blueprint but emerges self-generatively in the midst

[9]In traditional Chinese aesthetics, the notion of "accidental mastery" (妙手偶得, *miaoshou oude*) captures the spontaneous, unplanned emergence of beauty through a deep resonance with the medium. Zong Baihua explains that such moments are not products of deliberate intention, but of "spirit and technique becoming one" in an artist's generative flow of expression. See Zong Baihua, *Aesthetic Wandering*, Beijing: Sanlian Bookstore, 1981. Originally published in Chinese as 《美学散步》.

of action. This "accident" is not groundless randomness but an eruptive expression of long-accumulated pre-conscious tension and real-time relational resonance. It represents a mode of emergence sparked by free behaviour—a structural ascent *Aufgang* generated not from control, but from attunement.

1.5.3.4 The Unity of *Xiang* and *Dao*: Structural Ethics and Generative Action

Xiang (象) is not merely a cognitive tool—it possesses an intrinsic ethical force. It calls us to be responsible for being, through action. This "responsibility" is not an externally imposed moral code but arises from within the act of generation itself—each emergence of a *xiang* is not just a moment of affective resonance or expression, but a moral undertaking: a participation in the harmony of Heaven and Earth, a resonance with tension, a correspondence with historical becoming. In *xiang*-thinking, "that which is above form is called *Dao*; that which is below form is called *Qi*."(Peng, 2024) *Xiang*, then, is the mediating form that links *Dao* and *Qi*, bearing within it the ethical scale of structural generation.

Heinrich Rombach likewise emphasises that structure operates by "measure": freedom does not mean infinite expansion but the ability to find an optimal path within the bearable limits of tension.(Rombach, 2015a, p. 238) Structural freedom is not arbitrary openness, but the capacity to respond to complexity, integrate differences, and generate new relational constellations within the dynamic conditions of tension. In this sense, *xiang*'s capacity to "adapt to timing" and "move with potential" exemplifies a deep ethical sensitivity—aiming not at domination or vacuity, but at appropriateness and resonance. This expresses a profound ontological ethics (Jullien, 1999).

Hence, *xiang*-thinking is not an abstract value proposition but a regulatory mechanism within practice itself. It is not a system of norms imposed from outside, but an internal measure that arises along with the process of becoming. The formation of a *xiang* carries with it its own implicit *oughtness*—if it cannot resonate with the environment, if it cannot maintain the balance of tension within behaviour, then it collapses—it fails to sustain the structure of a true *xiang*.

This imminent regulatory logic means that the unity of *xiang* and *Dao* is not merely a cognitive integration, but the convergence of generation and normativity.

A *xiang* becomes a manifestation of *Dao* not only because it arises from sensing and experience, but because it embodies a tension-coordinating ethical structure. This structure is not an external value system, but a "form of constraint" that arises organically in the act of generation. It is a self-organising discipline, a stabilising function embedded in the event of emergence itself (Zhang, 1998).

Thus, *xiang*-thinking can be articulated as a complete generative mechanism: beginning with concrete action, it proceeds through sensing the field of experience, which triggers the generation of new forms and meanings, and simultaneously initiates an internal constraint—not an external command, but a structural measure that ensures sustainable emergence. This chain reveals *xiang*-thinking as both the source of generation and the principle of regulation—an ontological logic of adjustment that unites *Dao* and normativity in one generative gesture.

Kant famously sealed the "thing-in-itself" off from experience, creating a chasm between knowing and being. Mou Zongsan attempted to overcome this gap by translating Kant's moral metaphysics into a Confucian ontology of *liangzhi* (innate moral knowledge), though this has been criticised as a forced re-appropriation. In contrast, *xiang*-thinking and structural ontology provide a generative alternative that does not rely on the premise of the unknowable *noumenon*. In *xiang*-thinking, we do not begin with the "recognition" of an object, but with the "generation" of form through relational experience. This converges with structural ontology's insight: we do not need to prove being—we experience being in the unfolding of structure. The world is not something to be revealed but is continually *brought into form* (成象) through our structuring actions.

Xiang is not a Kantian "phenomenon" that hides the *noumenon*, but the generative event itself—the becoming-visible of being. As Rombach states, existence is not the being of objects, but the unfolding of structure, the appearance (*Aufscheinen*) (Rombach, 2015a, p. 131).

1.5.4 The Techno-Structural Unfolding of *Xiang*

1.5.4.1 Structural Ontology and the Technological Logic of *xiang*

If there is a technological line of thought inspired by *xiang*, it should take structural ontology as the operative form of resonance. Its core task is to handle the relation between system and structure. Within a landscape of many systems

and many structures, priority must be given to boundary governance at the level of the individual; more precisely, to the handling of difference and uncertainty. Rombach draws a technological distinction between system and structure. In his view, contemporary technics is system-based, and theories that center on systems have proved dominant, partly because they inherit the post-Renaissance tendency to conceive the world as a connected whole (Cusa 1981; Bruno 1584), and partly because cybernetics, information theory, and general systems theory supply precise tools for "maintaining order under disturbance" (Ashby 1956; Wiener 1948). Historically, Nicholas of Cusa already imagined the world as "a unity of a system" (Cusa 1981). Giordano Bruno further understood the cosmos as a continuous systemic whole (Bruno 1584). In German Idealism, notions such as "development" and "selfhood" tried to lend dynamism to the system, yet often subsumed becoming into the self-unfolding of the Idea (Hegel 1969).

In the twentieth century, Wiener's cybernetics used feedback loops to keep target variables at set points amid noise and perturbation. Shannon's information theory measured information as selection over a space of possibilities and framed efficiency through coding, channel, noise, redundancy, and capacity (Shannon and Weaver 1949). Bertalanffy's general systems theory emphasized open systems, steady flows, and equifinality, extending the mechanisms of "maintaining life states" into general organizational principles (Bertalanffy 1968). Structuralism, modeled on linguistics, treated meaning as networks of difference and positional relations, extracting "unconscious" relational patterns in myth, kinship, and symbolic practice (Saussure 1983). The resultant systemic perspective tends to presuppose boundaries and goals and to stabilize and reproduce given relational configurations through feedback and coding. Its strengths lie in regulation, coordination, and cross-domain isomorphism; its costs are closure, de-historicization, and an inadequate account of the birth of new relations (Rombach 2015).

By contrast, structural ontology shifts attention from "how to keep a system stable" to "how new relations are created and acquire graded reality." At appearing (*Erscheinen*), structural significance first enters action as a sensible trace. In giving (*Gebung/Gegebenheit*), datum and meaning are organized together as the present mode of reality—coding is not an external addition but an inner component of donation. In rising (*Aufgang/Aufstieg*), structure—through events—corrects or reconstructs itself, and the chain of ascent gains greater structural freedom within

the field of tension. Thinking in terms of structural ontology is both load-bearing and open; it integrates heterogeneity into higher-order coordination. Thus, "system theory" can be situated as a pre-structural operational framework (measurement, feedback, coding, cross-domain interfacing), while structural ontology supplies the genetic supplement and normative scale. Evaluation no longer relies on a single efficiency metric but on whether the world becomes more accessible, whether a structure' s capacity for resonance is repaired and enhanced, and whether higher-order coordination is achieved. In this way, historical and contemporary systems are taken up into the generative schema of appearing–giving–rising (Rombach 2015).

Further, Rombach distinguishes "many structures" from "many systems." The former emphasizes the co-presence of multiple structures that, through boundary negotiation and tension-tuning, generate "order within orders." The latter, if driven toward fusion, tends toward a super-system that flattens inter-systemic differences and thereby loses generativity. Consider information and services in airports or tourist zones: effectiveness does not lie in "transmitting more," but in whether interfaces and process rhythms create boundary values that are accessible and collaborative. If, from the perspective of many systems, one merely adds up systems without organizing interfaces, utility remains limited. Structural orchestration is required to keep communication smooth and the whole in harmony. From the standpoint of structural being, the composition of many structures follows a three-layer framework: (1) not to deny the value of contemporary systems, but to dock multiple systems by their own conditions and boundary values, refusing rough mergers that enforce unification; (2) to recognize that individual structures can be sustained only under dynamic co-generation among multiple systems—relations, tension, and generativity (in the structural sense) must take the lead to prevent ossification; (3) through ongoing correction and reconstruction, to elevate interconnection among many systems into structural generation, maintaining control over the process so that openness is preserved under load without rigidification or collapse (Rombach 2015).

Accordingly, connection under a structural perspective must prioritize the handling of relations between individuals over any centralized control. Only thus can the rhythm of structural flow and the degrees of freedom between structures be preserved. Given the nature of structure, tension should be retained among many structures, and stability should be achieved through continuous coordination

and a potential consonance across structures. Correlatively, technical evaluation criteria, inherited from system-centric thinking, should shift from a single measure of efficiency to the triad of appearing–giving–rising in structural features. Concretely, we read the yardsticks as: (1) whether the world becomes more perceptible and more collaborative; (2) the degree of resonance among systems within a structure —whether individual breaks and errors are repaired, whether latent consonance and creativity with other structures are sustained, and whether boundaries are transformed into collaborative boundary values that re-enter process; (3) an increase in structural freedom without amplifying exclusion or depletion. In sum, a structural approach to technics situates systems as operable channels and establishes structure as the generative ground of systems: it shifts from the closed-loop steady state of systems to the open ascent of structure and many structures, organizing polycentric collaboration so that difference becomes a resource of order rather than noise to be suppressed under a super-system' s control.

1.5.4.2 Calligraphy and Painting Share the Same Origin: Art and Technics

The technological thought in ancient Chinese tradition, often compared to *technē* in Heidegger's philosophy, must be approached with nuance(Jullien, 1999). For Heidegger, *technē* is not merely a means of fabrication or instrumental action; it is one of the primordial modes of revealing (Aletheia), a letting-be of beings in their unfolding. In *The Question Concerning Technology*, Heidegger recalls the Greek origin of *technē* as a form of *bringing-forth* (Hervorbringen) from concealment (Verborgenheit) into unconcealment (Entbergung)—a generative process that co-originates with truth itself(Heidegger, 1977a).

Similarly, in Heinrich Rombach's structural ontology, art is not an imitation of an external world nor a vehicle for subjective expression. Instead, art is rooted in the very logic of generative Being. An artwork is a *partielle Offenbarung*—a partial revelation—within a dynamic field of tensions. Each image, painting, or melody is not a self-contained artefact but a *Knotenpunkt*, a node shaped and sustained by the relational interplay among structural forces. A true work is never an externally imposed form but a spontaneous emergence from the transparent circulation of internal tensions (Rombach, 2015a, pp. 3–47).

The art, like structure itself, resists closure and preconfiguration. It is an opening of existence that breathes through difference, flux, and incompletion. Each element in a work is not a mechanical component assigned a functional role, but a site of mutual resonance within a dynamic relational field.

While Heidegger's notion of *technē* must be distinguished from modern industrial technology, it must also be contrasted with the Chinese tradition of technology. In ancient China, technical activity was embedded within a cosmological framework—specifically, the doctrine of the unity between Heaven and humanity (*tian ren gan ying*, 天人感应). Technology was not designed to reveal the essence of Being (*Sein*) in the metaphysical sense, but to harmonise the movements of *qi* (气) and align human action with the spontaneous rhythms of the cosmos. In this way, ancient Chinese technology resembles art: both are characterised by *offene Struktur* (open structurality), rooted in relational emergence.

In this context, *xiang* (象) is not merely a representation of the world but a vital node of structural manifestation. From the perspective of Rombach's structural phenomenology, *xiang* is neither an abstract symbol nor a fixed image. It is a *Knotenpunkt*, a generative juncture formed within a tension field—a partial revelation (*partielle Offenbarung*) of Being in its dynamic unfolding. It is not the image *of* a thing, but a trace of existence itself—its resonance, contour, and movement.

Xiang, thus, implies a technical dimension: it is not artifice in the modern sense but a mode of relational enactment. Chinese art is not equal to technique, but its unity with technique emerges precisely from the structural understanding of *xiang*. According to the traditional principle of "calligraphy and painting share the same origin"(*shuhua tongyuan*)[10], both art (e.g., painting, calligraphy) and technique (e.g., character construction, divinatory design) unfold within the same structural dynamism (Gao, 2019). These are not opposites—subjective aesthetic vs. objective manipulation—but co-emergent *generative acts* within a system of structural openings.

[10]The concept of "calligraphy and painting sharing the same origin"(shuhua tongyuan) is a foundational theory in traditional Chinese art, tracing back to Zhang Yanyuan's *Record of Famous Painters of All Dynasties* (9th century), where he noted that "calligraphy and painting are of the same body but differ in function."This idea highlights the shared brush technique, compositional logic, and aesthetic principles between calligraphy and painting

Calligraphy is not decorative writing; it is the kinetic articulation of tension. Landscape painting is not representation but a condensation of energetic structures into *xiang*-forms. The *Bagua* system of the *Yijing* is not a symbolic taxonomy but a dynamic tool for modulating cosmic tensions. Chinese characters are likewise not symbolic labels but structural nodes formed at the intersection of cultural, natural, and vital tensions. Each character embodies the field of tension between Heaven and Earth, a resonant fragment of the world's generative unfolding.

Chinese writing was never a pre-designed symbolic system but the organic outcome of tension-based relational processes. Characters were not arbitrarily invented, but crystallised from the relational dynamics of *yi-xiang*. Yin and yang lines were not fixed substances, but directional forces in movement; numeric images condensed rhythmic transformations; and characters emerged from lived observation —of rivers, animals, tools—each bearing the imprint of vital structure (Gao, 2019). Ultimately, Chinese script is not a container of static meaning, but a living network of becoming—a structural medium that emerges between opening and contraction, between cosmic tension and expressive form. It is not a replica of the world, but part of its generative movement.

1.5.4.3 The Encroachment of Modern Technology

When the flux of language encountered the logic of technology at the critical juncture of the twentieth century, Lin Yutang faced a problem that Western technical systems could scarcely address directly: how to manage the Chinese script system, with its thousands of complex pictographic characters, within the mechanical framework of the typewriter.(Mullaney, 2017) Western typewriters were designed with alphabetic systems in mind: limited in number, linearly combinable, logically tight, and enclosed through a clear functional segmentation and ordering. Each key and every keystroke operated within a pre-established chain of internal systematic order. By contrast, the Chinese character system is not the product of alphabetic combinations. It is itself a structural network naturally generated and ceaselessly flowing within a field of pictographic tensions. To impose systemic categorisation upon Chinese characters would be akin to trying to measure a flowing cloud with a steel ruler.(Mullaney, 2017)

Lin Yutang profoundly sensed this. He did not simply disassemble Chinese

Figure 1.4: Lin Yutang's Chinese typewriter prototype, restored by an internet blogger. Image excerpted from a web video.`https://www.youtube.com/watch?v=yNoWMaOyWHY`

characters into discrete coded units. Instead, he invented the *Two Corners Instant Index System*, a technical solution that respected the morphological tensions of Chinese characters and conformed to their natural structural sensibility. In his design, each character was divided into an upper and a lower part—not according to semantic fields, nor phonetic groupings, but based on the natural trajectories of visual tension and morphological differences.(Mullaney, 2017) The upper and lower parts served as directional tension nodes (*Knotenpunkte*), which the typist would perceive and locate, enabling them to swiftly find the corresponding character within a web of morphological tensions.

Each act of retrieval was not merely the mechanical invocation of a fixed code but a re-sensing and reactivation of the visual field of tension. Lin Yutang's typewriter was not a rigid index of characters; it was a network of structural tensions freely unfolding through relational morphology.

Even more boldly, Lin created what he called *pseudo-radicals* during the classification process: he no longer adhered rigidly to the authority of traditional radicals but, instead, recombined and redefined classifications based on the intuitive perception of visual structures themselves, within the play of morphological tensions. This approach broke through the boundaries of inherited systems, opening a path toward the regeneration of order within tension relations. Lin Yutang did not allow technology to dominate Chinese characters; rather, he allowed technology to breathe

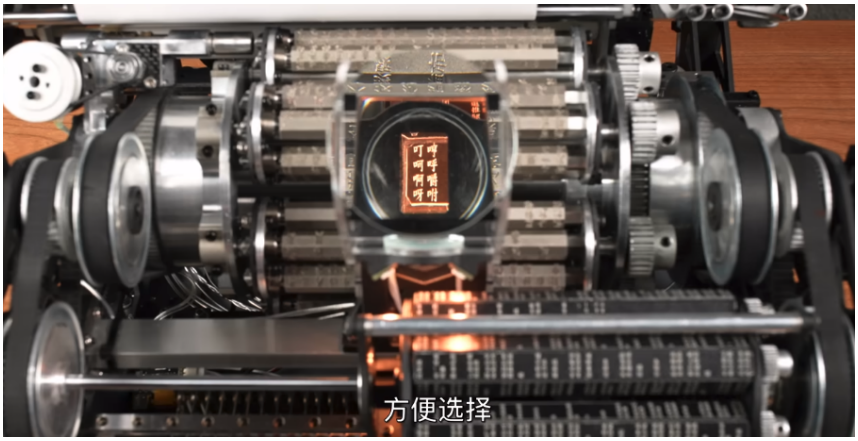

Figure 1.5: Magic Eye, Lin Yutang's Chinese typewriter, Prototype restored by internet blogger, Image from web video excerpt `https://www.youtube.com/watch?v=yNoWMaOyWHY`

in synchrony with the structural tensions of the script. In his typewriter, technology was no longer a system that ruled over objects but became an organ attuned to the flux of existence. In this sense, Lin Yutang was not merely an engineer: he was an architect of existential structures, continuing the thread of *Xiang* thinking into the mechanical age. His invention was not a simple technological innovation; it was a magnificent attempt to build new passageways within the flow of tensions and to allow the living vitality of Chinese characters to continue unfolding and deferring freely within the structural unfolding of existence.

1.5.4.4 Computational Input Structures

In the early stages of personal computing, early PCs (Personal Computers) were not designed with the unique characteristics of the Chinese script in mind. Computer storage capacity, processing power, and rendering technology were primarily developed for English-speaking environments. Chinese characters are far more complex than English letters—whereas a 9×14 pixel grid is sufficient for Latin alphabets, most Chinese characters require at least a 15×16 pixel grid for accurate display.

Two major approaches were developed to address this challenge: software and hardware solutions. In 1983, the Sixth Research Institute of the Ministry of Electronics Industry in China created the *Chinese Characters Disk Operating System* (CCDOS) on IBM (International Business Machines) hardware. CCDOS

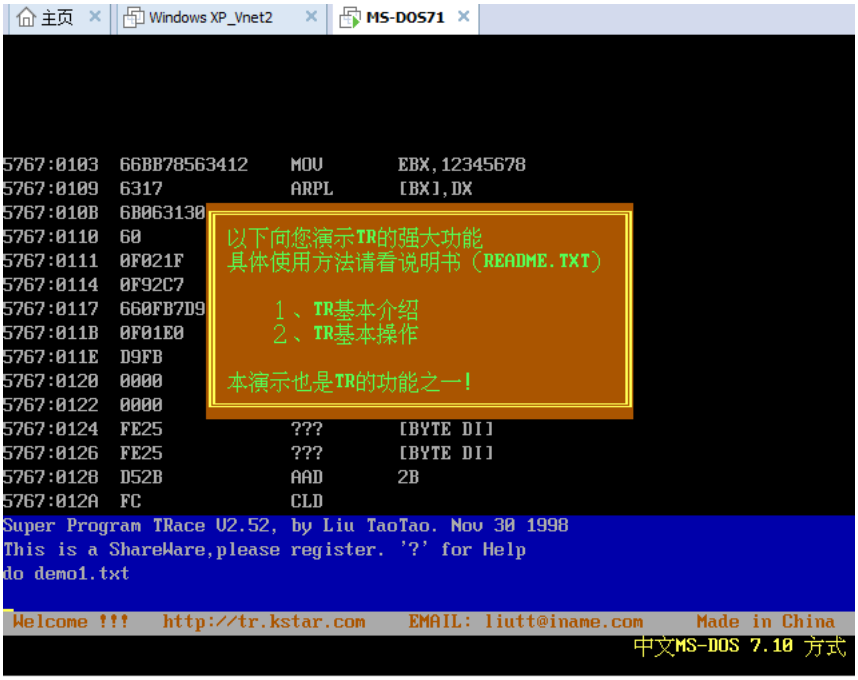

Figure 1.6: CCDOS Chinese System `https://programmersought.com/article/42033510888/`

represented the first software-based method to display Chinese characters on personal computers. Developers discovered they could render images using software, and this insight enabled them to develop a solution that bypassed hardware limitations. CCDOS 1.1 required at least 320 KB of memory, and CCDOS 2.0 demanded 512 KB, though retrieval speed for official characters remained slow.(Cai and Zang, 1989)

Since the 1960s, Ni Guangnan, an engineer at the Institute of Computing Technology, Chinese Academy of Sciences, has been instrumental in driving and witnessing the development of Chinese character information processing. In the 1960s and 70s, mainstream computing was based on the Latin alphabet (Zhu, Ni, and Z. Chen, 1978). Many experts considered Chinese characters incompatible with existing encoding systems, memory architecture, and display control, proposing pinyinization or even the abolition of Chinese characters to align with international standards.

Ni chose a different path. He recognized that Chinese characters were not merely symbols but graphical embodiments of Chinese culture. Their unique construction principles—pictographic, ideographic, and phonetic-semantic—carry profound structural logic and semantic information. (Ni, Zhu, and J. Liu,

1981)Instead of simplifying characters into pinyin, Ni aimed to embrace their complexity and develop computational methods grounded in Chinese writing and reading practices(Ni and Z. Chen, 1980).

Motivated by both cultural consciousness and engineering logic, Ni began to systematically study how computers could interpret and process Chinese characters. He charted a path distinct from Western paradigms, focusing on dot-matrix visual modeling, encoding character components, and using contextual reasoning to simulate human input behavior. These theories culminated in foundational achievements such as the Graphic Chinese Character System, Associative Input Method (AIM), LX-80 Microcomputer, and Chinese Character Card, marking some of the most original contributions in Chinese computing history.

In the early 1970s, Ni began exploring the complete problem space of Chinese character input, encoding, and display. At the 1974 National Collaborative Meeting of the "748 Project,"he formally proposed the idea of using a graphical mechanism to process Chinese character information.(Ni and Z. Chen, 1980) Unlike traditional encoding methods that treat characters as atomic units, his theory started from the two-dimensional structural characteristics of Chinese script, using graphical models to build an information processing path.

He pointed out that Chinese characters originate from pictographic and ideographic constructions. Their basic expressive units are composed of spatial component arrangements—vertical, horizontal, enclosed—and therefore require systems capable of indexing by parts, structural decomposition, and contextual association. This theoretical framework laid the foundation for graphical input methods and Chinese operating systems (OS). (Ni and Z. Chen, 1980)

In 1979, Ni developed China's first prototype of a complete Chinese graphical information processing system. It utilized 16×16 and 24×24 dot matrix fonts and integrated font storage, character generation, input control logic, and graphical display interfaces. The system supported over 6,000 commonly used characters, offering input, recognition, encoding, display, and printing.(Ni, Zhu, and J. Liu, 1981) Early interactive features included associative suggestions and structure-based indexing, marking a shift from character encoding to graphical modeling. In 1983, Ni developed the LX-80, the first Chinese microcomputer dedicated to processing Chinese information. Using the Zilog Z80 processor, it fully integrated input, font loading, display control, and printing within the hardware. The

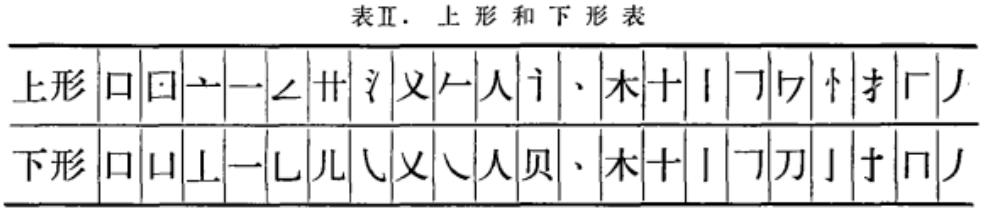

Figure 1.7: To enable rapid retrieval of Chinese characters, the system adopted a segmented encoding method based on the structural features of the character's head and body. Each character was divided according to its structure: the head served as the initial index, followed by filtering through the body segment.

LX-80 embedded Chinese handling directly into hardware logic, granting it the same "native character" status as the English alphabet—a significant engineering milestone.(Ling, 2005)

As the IBM PC (Personal Computer) architecture spread in China, Ni adapted. He modularized LX-80's core technologies into the "Chinese Character Card," also known as the "Han Card," which could interface with IBM PC buses. (Ni, Qin, et al., 1994) These cards contained font ROMs (Read-Only Memory), decoding circuits, and graphical modules that enabled seamless Chinese input, display, and printing on IBM PCs. This "hardware adaptation + software interface" model reduced system costs and facilitated the transition from specialized devices to general-purpose platforms.

Ni not only formulated the "graphical mechanism for processing Chinese characters" but also developed key components that formed the technical backbone of Chinese information systems. His contributions had a long-term impact on OS localisation, software Han cards, and native language processing research. (Ping et al., 1982) Ni's most notable contribution was the Associative Input Method (AIM) in the 1980s. More than an efficiency tool, AIM was a restructuring of human-computer interaction based on linguistic and cognitive patterns. AIM simulates the anticipatory logic of human expression, where context naturally prompts subsequent language units. Unlike traditional input methods reliant on exhaustive character encoding (e.g., pinyin or zone codes), AIM uses input content as contextual clues. A statistical model activates the most semantically related phrases or words for user selection, merging input and semantic prediction.

Technically, AIM's engine comprises a frequency dictionary, associative chains,

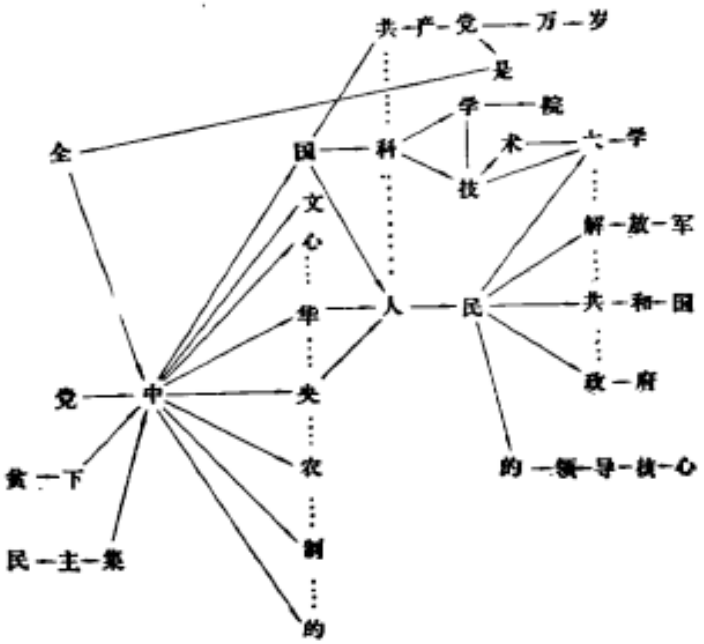

图 6　联想记忆结构示意

Figure 1.8: Partial diagram of the “association chain”for Chinese character input

context buffers, and candidate optimization. It prioritizes high-frequency co-occurrence patterns, tracks user input history with sliding windows, and combines static and dynamic weights to sort candidates. It also features self-learning to personalize suggestions over time. For example, typing “Zhonghua”may generate candidates like “Chinese nation,”“People’s Republic of China,”or “Chinese cuisine.”Repeated selections adapt future rankings, creating personalized semantic modeling. Interactionally, AIM shifts input from “code-based entry”to “semantic participation,”making users co-creators of language construction. As Rombach suggested, if language is a structure of mediated relations, then AIM becomes a generator of difference, activating potential nodes and semantic paths with each input.(Ping et al., 1982)

Ni did not compress Chinese into ASCII (American Standard Code for Information Interchange) or Pinyin [11]. Instead, he rebuilt input, encoding, display, and storage based on the Chinese graphical structure. This aligns with Rombach’s

[11]Pinyin is the official Romanization system for Standard Chinese in mainland China, using the Latin alphabet to represent Chinese pronunciation

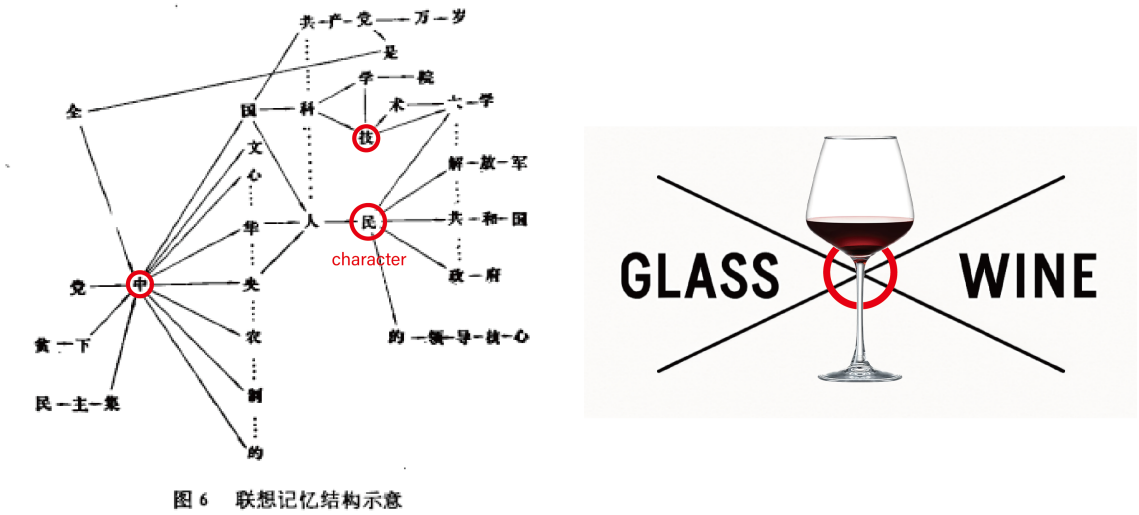

图 6 联想记忆结构示意

Figure 1.9: The structural relationship between Lombach's wine glass diagram and Ni Guangnan's Chinese character input association memory diagram. Both diagrams show structural existence, one as a wine glass in a structural relationship and the other as characters in a structural relationship.

view that structure must unfold from within rather than being externally imposed. AIM is not a linear prediction model—it is a tension-structured, multi-path semantic engine. It generates context-based candidates and accommodates variability, echoing the structural tension behind generative openness in technology. In essence, Ni's approach built a generative structural network responsive to the Chinese language and culture. His tools were not mere input devices but embodied systems grounded in structural philosophy, where every keystroke referenced and remade structure. Our inquiry into Chinese characters reveals a broader truth: Chinese technical thinking may already be embedded in today's technologies. The structured approach guiding our present research should extend into future technological philosophies.

1.6 conclusion

This article sets out to do two things: to reconstruct *xiang* as a contemporary, cross-cultural philosophical concept and to articulate a technological logic of *xiang*-as-resonance grounded in structural ontology. We begin with a critique of Mou Zongsan, then return to Wang Yangming' s field of resonance (*ganying*) and

trace key dialogues with Heidegger. After that, we turn to Heinrich Rombach' s structural ontology to furnish *xiang* with a precise, operational grammar. Along this path, *xiang* is no longer a diagrammatic sign or mere metaphor; it becomes a generative mechanism that organizes appearing, sustains relations, and keeps formation ongoing.

On the technological side, we distinguish *system* and *structure* and thereby extend the discussion of structural ontology in dialogue with *xiang*. If the resonant character of *xiang* operates as a technological idea, its essence is first structural rather than merely functional, and it carries forward structural ontology' s mechanisms of relation and generation.

We have examined technological developments around Chinese characters, from the early co-origin of calligraphy and painting to modern Chinese typewriters and computer input systems. Throughout these trajectories, a resonant mechanism in technical thinking persists. We can even discern here a shift from system to structure, namely in the concrete cases of how Chinese characters enter the mechanical and informational eras.

With regard to the specificity of modern technics, we can thus propose the following insight: resonant technics constitutes a structural pathway for technology. It situates *systems* as operable channels and establishes *structure* as the generative ground of systems. It shifts from the closed-loop steady state of systems to the open ascent of structure and "many structures," organizing polycentric collaboration so that difference and uncertainty at individual boundaries are acknowledged and transformed into resources of new order, rather than being suppressed and eliminated as noise under the control of a super-system.

Chapter 2

Can generative AI be generally Creative?

David S. Watson maintains that the epistemology and ontology of generative models reside in the identification of unrealized possibilities, whether through these models themselves or through systems closely akin to them. He writes: We identify unrealized possibilities via generative models, or something very much like them." And again: Unrealized possibilities are what generative models ought to learn under ideal conditions." These formulations bring to light a central philosophical difficulty: generative models are oriented toward a peculiar form of contingent necessity. In the collaborative pursuit of this necessity between humans and agents, how precisely is creativity articulated? (Watson, 2023) Is the creativity attributed to generative models nothing more than statistical recombination—a mere simulacrum—or might it achieve genuine structural evolution within the agent itself? From the standpoint of machine learning algorithms, in what direction ought this inquiry to advance?

Simondon's reflections on imagination and the cycle of the image furnish a powerful philosophical apparatus for grasping creativity in generative models. Within Simondon's schema, the problem of contingent necessity is recast as follows: how does transduction engender necessary individual structures and creative forms out of tensions provoked by contingent differences within the pre-individual domain? Contemporary scholarship has applied these notions directly to generative AI. Aires contends that data-driven individuation integrates local potentials into emergent functionality, eschewing reliance on preset structures. Levin conceives high-dimensional manifolds as Simondon's transductive milieu, wherein models in-

dividuate novel configurations by resolving metastable tensions and thereby produce coherent novelty that is not merely memorized. Kerruish invokes Simondon's cycle of the image—anticipation, perception, symbolization, invention—to advance the notion of technical imagining as a recursive co-constitution between humans and generative machine learning, even as she dismantles the persistent myth that equates generative outputs with human imagination (Aires, 2025; Levin, 2026; Kerruish, 2025).

The decisive difficulty, however, concerns the manner in which the framework confronts difference. Simondon elucidates how systems respond to difference, yet the ontological provenance of difference remains indeterminate. Transduction presupposes antecedent pre-individual tensions, thereby courting circularity. In present generative practices, humans, as co-constituents, persistently furnish sources of difference. Yet in practice, novel outputs frequently amount to nothing more than statistical recombinations of unrealized possibilities latent within data distributions (Watson, 2023). They seldom embody truly inherent structural differences, nor do they disclose how the agent might autonomously confront entirely novel differences (Watson, 2023). This inquiry pursues the question of how agents might structurally engage difference from within. To that end, Heinrich Rombach's structural ontology (Strukturontologie) is introduced as a complementary dimension. Rombach underscores concretization (Konkretion): structure is never an abstract pre-individual potential but progressively concretizes from fields of possibility into forms endowed with solidity (Festigkeit) and living vitality (lebendige Struktur). This unfolding proceeds as a continuous, hierarchically nested process wherein lower-level potentials crystallize into higher ontological structures through reciprocal field interactions (Rombach, 1971/1988). Moreover, Rombach's co-creation (Konkreativität) discloses that difference emerges not unilaterally but through mutual penetration and reciprocal shaping across multi-layered structural fields. The concretization of one structure thereby becomes a new source of tension for another. In the domain of generative AI, this suggests that difference may arise endogenously within models or within co-creative fields between models, surpassing Simondon's cycle and transmuting creativity into an inherent open structural evolution of the agent itself (Rombach, 1971).

Through persistent dialogue between Simondon's dynamic process of individuation and Rombach's coordinates of structural ontology, this thesis elaborates a

formalized dual framework. The framework construes creativity as the system's structural response to difference. Having scrutinized the algorithms of generative models, we advance two necessary conditions for individuation: prior stability, which secures consistency and predictability in the process; and determinate experiential structures, which permit the system to recognize difference and respond through adaptation and innovation. Creative evolution then proceeds through three interrelated moments: difference recognition, the system's capacity to perceive and register environmental differences; tension modulation, the regulation of internal potentials to accommodate instability provoked by difference; and structural transduction, the system's self-transformation in response to difference, engendering new states and possibilities.

Application of this framework to denoising diffusion probabilistic models (DDPMs), generative adversarial networks (GANs), variational autoencoders (VAEs), and vision-language models (VLMs) discloses that most systems confine themselves to recombining pre-trained paths during inference. They seldom attain true structural transduction or modify the underlying generative logic. While multimodal and temporal extensions exhibit promise, the realization of inherent agent creativity continues to demand adaptive mechanisms capable of sustaining continuous ontological transformation.

2.1 Simondon: Generative Creativity in the Process of Individuation

Simondon's analysis of imagination and creativity, rooted in his theory of technics and conception of individuation, articulated in the last century, continues to bear significant relevance. In his view, creativity takes shape as invention, the fourth phase in the cycle of the becoming of images, which both follows and surpasses the preceding phase of symbol-images. This perspective is grounded in the idea that the image is not a fixed product but rather a continuous process of becoming —a genetic cycle—within which imagination acts as the endogenous motor force that sustains and propels this process (Simondon, 2023, pp. 30–31). The image is not given in advance or constructed solely by consciousness. It emerges gradually through the ongoing interaction between the individual and the milieu. This process

shows how psychic functions are organised and traces the concrete development of individuation (Simondon, 2023, pp. 30–31). Simondon divides the development of the image into four distinct and progressively evolving stages that together form a continuous, cyclic process of image genesis. Each stage emerges as the evolutionary outcome of the preceding one and prepares the conditions for the next. As the final stage, creativity appears as the sublimation and transformation of the previous three stages.

The first phase, Motor Tendency, constitutes the initial point of image genesis. At this stage, the image does not yet involve explicit perceptual experience but exists as a motor schema rooted in the organism's instinctual gestures and systems of posture. It manifests as an anticipatory capacity to respond to environmental stimuli. Through these implicit and unconscious behavioural tendencies, the individual pre-simulates possible situations, providing a preliminary framework for adaptation to the milieu. These images remain non-representational and persist as latent potentialities embedded within the organism's motor structures (Simondon, 2023, pp. 112–113). In the second phase, Perceptual Integration, with the arrival of actual perception, the individual matches and calibrates the motor schemas formed in the previous phase with current sensory input. At this stage, the image begins to acquire structure and clarity, as the perceptual system integrates these elements and transforms motor tendencies into concrete perceptual images. These images both reflect real experience and revise initial anticipations, generating stable perceptual structures through ongoing interaction with the milieu. The images at this phase have a strong reference to reality and constitute a crucial component of cognitive adaptation (Simondon, 2023, pp. 112–113). Third phase, Affective Resonance and Memory. In this phase, the image, as it settles after perception, becomes coupled with the affective system, forming symbol-images charged with emotional value. These images are no longer merely the results of perception but emerge as psychological symbols imbued with meaning, tension, and sometimes conflict. They are stored in memory and, when reactivated in the future, influence both motor tendencies and perceptual integration, becoming the point of departure for a new cycle of image genesis. Emotion here plays a dual role of inscription and reactivation, endowing the cycle of images with historicity and cumulative depth (Simondon, 2023, pp. 112–113). Creativity represents the sublimation of this entire cycle. As the fourth phase, it marks the individual's transition beyond passive reproduction and

imitation, enabling the active reconfiguration of internal schemas and an engaged intervention in the reality of the milieu. Creativity manifests as a threshold or leap: when the development of psychic images reaches the stage of symbolic integration, the persistence of unmet needs or new tensions between the organism and its environment creates the conditions for its emergence (Simondon, 2023, pp. 114–115). Simondon defines creativity as an active form of transgression or surpassing. When the existing system of perceptual and affective images approaches a state of saturation and can no longer accommodate new information, the individual does not remain confined within established patterns. Instead, invention is triggered as a means of restoring coherence with the milieu through new mediations (Simondon, 2023, pp. 114–116). Therefore, genuine innovation (Creative) is not an absolute or sudden novelty but the culmination of a gradual maturation process. It stands as the apex of this cyclic genesis, achieving a qualitative transformation built upon accumulating prior experiential images. At this stage, images within the internal psychic system are externalised as novel realities for the first time, accomplishing the fundamental transition from imagination to invention.

According to Simondon, creativity, or invention, functions as a structural response within the image-generating system. This response is triggered when new demands emerge due to differentiations in the external milieu. As these demands arise, the existing network of images and symbols reaches its limits of integration and must reorganise to restore coherence. When new potential variables appear within the individual's milieu of genesis—such as temperature, duration of use, comfort, feedback values, or other physical parameters—the existing system of images and symbolic structures reaches the limits of its integrative capacity. This condition produces a functional disequilibrium that requires further adaptation (Simondon, 2023, pp. 114–116). At this point, the individual's pre-existing perceptual–affective schemata can no longer effectively incorporate these new elements. The system then enters a state of instability, creating tension from the mismatch between external changes in reality and the inertia of internal structures (Simondon, 2023, pp. 114–116).“*When all the various aspects of the object are simultaneously represented within the imprinting system concerning that object, with an inner equilibrium that constitutes both the coherence and at the same time the tension of the system.*” (Simondon, 2017, p. 152) This tension appears within the subject as a newly perceived but still unmet need, which drives the system

toward structural reorganization.“*This coupling of incompatible yet linked qualities expresses the supersaturation of the memory image—a metastable state necessary for the invention, that is, for a structural change restoring compatibility within a new system.*” (Simondon, 2017, p. 152) Creative action unfolds as a response driven by this tension. It works by constructing new image structures or mediating mechanisms that reorganise the old system and restore coordination between the individual and the milieu. Therefore, creativity does not arise from spontaneous “flashes of inspiration,”but from the recognition of difference, the refusal to tolerate tension, and the effort to reshape the relation between the individual and the environment. By generating new image–symbol systems that drive the system to move beyond the old symbolic order, restore stability, and enable re-individuation within the relation to the environment.

From imagination to creativity, it is fundamentally dynamic and transductive across stages. Creativity or innovation constitutes the pinnacle of Simondon's cycle of image genesis and evolution. When existing image structures can no longer incorporate external differences, creative behaviour enables the system to surpass inherited configurations and open new organisational pathways. Importantly, in Simondon's model of the image mechanism, imagination and creativity are not ontologically separate; both arise from the same image-generating system. Their primary distinction lies in functional orientation: imagination tends toward internal simulation and rehearsal, addressing tensions that remain manageable within the system, while creativity is directed toward irreconcilable differences, outwardly expressed as the reconfiguration of reality and the invention of new image systems. This paper focuses specifically on creativity and does not examine imagination in detail.

2.2 Creativity in Rombach's Structural Ontology: From the Perspective of Individuation and Structural Ascent

Heinrich Rombach (1917–2007) stands among the most significant figures in twentieth-century German phenomenology. Profoundly shaped by Husserl and Heidegger, he nonetheless subjected their thought to incisive critique and radical

transformation. In his central work, Strukturontologie: Eine Phänomenologie der Freiheit (Structural Ontology: A Phenomenology of Freedom, 1965/66), Rombach elaborates an entirely novel ontological schema: structural ontology (Rombach, 1971).

The fundamental proposition is unequivocal. The world consists neither of isolated entities—fixed, immutable objects—nor of closed systems with predetermined mechanical structures. It is constituted by structures (Struktur). Structure is never static; it forms a dynamic, reciprocally determining totality that Rombach terms a constellation (Konstellation). Within this constellation, each element defines and perfects every other, resembling a living network that continually weaves and reweaves itself. Structure commences as pure potentiality; only through incessant self-movement does it attain genuine emergence (Aufscheinen). This movement ultimately discloses human freedom—not as arbitrary caprice, but as autonomy and liberation secured through the self-precisification and concretization of structure (Rombach, 1971).

Within this schema, creativity (Kreativität, or Schöpfung) sheds its conventional sense. It ceases to signify sudden genius, subjective talent, or isolated innovative production. Creativity becomes a cardinal category of structural ontology: it constitutes structural dynamics (Strukturdynamik)—the inner movement and transformation of structure—and structural genesis (Strukturgeschehen)—the essential character of structure's passage from potentiality to actuality. Creativity is the constructive process that structure executes from within, through its own inherent motion. Its ultimate telos aligns with Rombach's phenomenology of freedom, directing toward structural precisification (Exaktheit: ever-greater precision and irreplaceable functional positioning), concretization (Konkretion: the shift from abstract universality to concrete singularity), and autonomy (Autonomie: self-generation independent of external determination). This conception is no idle speculation; it follows a rigorous logical sequence—from potential existence, through concretization and individuation, to structural ascent, culminating in the emergence of freedom within creativity.

First, structure is never a pre-given abstract totality or enclosed system. Traditional philosophy frequently conceives the world as layered entities or machine-like mechanisms; Rombach decisively rejects both. Structure originates in potentiality, akin to an un-germinated seed. It acquires reality and precision

solely through ongoing concretization (Konkretion). Concretization signifies the precise, irreplaceable placement of structure's universal, interconnected functions — "everything in everything" —into every singular functional position. The identity of "everything in everything" is thereby divested of empty universality and rendered concrete, irreducible. Absent concretization, structure remains trapped in a universal condition, unable to manifest as living reality. Concretization thus forms the sole foundation for structure's transition from potentiality to actuality, sustaining all subsequent movement. Second, concretization proceeds exclusively through individuation (Individualisierung). Individuation does not isolate the human as a detached "I" or fragmented fragment. Rather, it enables each person—or what Rombach, echoing Heidegger, designates Dasein (being-there)—to assume a unique, unrepeatable position within the relational totality of structure. Through this positioning, the human elevates from abstract bearer to origo (the origin-point of structure), becoming identical with the whole. Every individuated element expresses the plenitude of the totality, much as a single cell embodies both itself and the complete functionality of the organism. Individuation entails active participation, not withdrawal. The self no longer merely belongs to structure; through singular positioning, it becomes the inner force driving structure's self-construction. This moment transfigures the abstract constellation into living, concrete reality.

Third, individuation is never a singular event or fixed state. It manifests as structural ascent (Aufstieg), a dynamic unfolding. Ascent constitutes the immanent criterion of structural genesis (Strukturgeschehen). It entails continuous correction (Korrektur), reconstruction (Rekonstruktion), precisification, and self-critique (Selbstkritik). Ascent accrues gradually through labor (Arbeit) and the consistency of behavioral consequences (Konsequenz). Every dimension of existence —from quotidian choices to decisive acts—is integrated into the overarching functional relations. Structure thereby ascends toward heightened precision and concreteness. Only in ascent does structure fulfill Rombach's imperative: "all or nothing." Partial structure inevitably collapses; compromise precipitates total dissolution. In dynamic ascent, structure ceases to be an external frame and becomes a living process of self-generation and self-perfection.

Creativity emerges precisely within this ascent, impelled by individuation and concretization. It manifests as the intrinsic essence and decisive outcome of the process. Creativity demands completeness— "all or nothing." It is not mere

novelty or abrupt inspiration. Through creative construction and the rigorous consistency of behavioral consequences, the self becomes the foundation (Grund) of the entire structure in its own labor. Creativity propels structure from potentiality to actuality, opening fresh spaces of possibility within the dynamic unity of individual and whole. Only along this path of ascent does structure attain true autonomy (Autonomie: freedom unbound by external rule) and originality (Originalität: rooted uniqueness). Creativity thereby constitutes the supreme expression of structural dynamics and structural genesis—not a rare endowment, but the immanent force of structure's self-liberation. This logical sequence culminates in Rombach's central aim: the emergence of freedom (Aufscheinen der Freiheit). Freedom is neither idleness nor arbitrary volition; it is liberation realized when structure surpasses its own limits through precisification, concretization, and autonomy. Creativity drives this breakthrough from within. In every concretely individuated act, the entire constellation re-emerges as a space of possibility.

2.3 Internality and Externality of Difference and Their Weight Allocation

Simondon and Rombach, though emerging from distinct philosophical traditions, converge on the essential mechanism of creativity: the system's active capacity for structural response to difference. Creativity is never a passive registration or mere endurance of difference; it is a dynamic operation wherein the system reorganizes its internal relations, modulates instability, and generates novel paths to restore or elevate systemic coherence. Yet the two thinkers diverge decisively in their assignment of weight to the source of difference. Simondon accords primary activating force to the external and relational dimension—the symbiotic milieu—while Rombach places decisive emphasis on the internal dynamics of structure itself: the multi-layered penetration and self-generative movement of the structural field (Simondon, 2017; Rombach, 1971).

For Simondon, difference originates in the metastable tension of pre-individual reality, a saturated field charged with incompatible potential energies and disparities of magnitude. This is not mere external contingency in the crude sense; it must be activated and actualized through the symbiotic interaction between

the individuating being and its associated milieu. Transduction thus becomes the decisive operation that endows the external with its activating weight: the system selectively integrates functional incompatibilities and instabilities from the environment, incorporating them into a higher organizational order. Individuation is therefore never the linear unfolding of a pre-given entity but a co-individuation between individual and milieu. In this schema, the external bears substantial activating force; difference, though latent in the saturated potential of the pre-individual, only precipitates creative phase transitions through structural engagement with the milieu (Simondon, 2017).

This weighting becomes particularly evident in Simondon's analysis of technical creation. He invokes the evolution of the heat engine: early designs feature relatively isolated components; through concretization, elements such as cooling fins assume dual roles—heat dissipation and mechanical load-bearing—integrating what were originally incompatible orders of magnitude. Similarly, the transition from vacuum tube to triode resolves functional interference between anode and control grid by introducing a screen grid, simultaneously increasing complexity and systemic coherence. Such inventions are not external accretions but self-organizing responses of the technical object to usage contexts, material constraints, and functional thresholds. Creativity here manifests as the capacity for structural integration of external tensions, with the aim of attaining higher-order functional consistency. Technical individuation remains embedded in multiple external constraint fields—user demands, environmental conditions, social needs—with the human inventor participating as a mediating node rather than sovereign origin (Simondon, 2017).

In contrast, Rombach's structural ontology assigns the decisive weight of difference to the internal field of structure. Difference does not arrive as contingent external trigger; it emerges as the inevitable inner fissure, asymmetry, and unintegrated potential that arises within the structural field through multi-layered relational penetration and progressive concretization. This internal tension propels structure toward higher ascent; it is borne and regulated by rhythm as an intrinsic mechanism—not mere temporal repetition, but the capacity for coordination and re-organization of elements across evolutionary sequences (Rombach, 1971).

For Rombach, structure constitutes a dynamic, constitutively open network that persists in a state of perpetual non-closure. This inherent openness generates the internal tension field within which creation becomes possible. Creativity thus

manifests as structure's self-response to its own asymmetry and incompleteness: through precise embedding within evolutionary path reconstruction, it achieves new dynamic equilibrium and elevated organizational levels. Authentic creation demands both generativity and structural fit; it serves as both the point of deviation and the hub of re-coordinated order. Precision emerges here as the generative marker of successful activation of the structure's intrinsic rhythm (Rombach, 1971).

This divergence in the internal-external weighting carries significant theoretical import. In Simondon's schema, creativity depends more heavily on relational external activation and symbiotic evolution between technical objects and their milieus—an orientation that resonates strongly with planetary-scale thinking (Bridle, 2022). In Rombach's structural ontology, creativity arises predominantly from the internal self-unfolding of the structural field, offering a more ontologically inclusive and internally consistent foundation for the creativity of non-human systems, including generative processes in artificial intelligence. By displacing the axis of creation from individual-milieu relations to the immanent generative dynamics of structure, Rombach provides a more open philosophical framework for comprehending contemporary technical creation—such as the structural rhythm operative in AI image generation.

2.4 Generative Models in the Context of Individuation

Watson offers an ontological and epistemological dissection of generative models —particularly GANs and tree-based ensemble methods—that reveals their profound implication in what he terms contingent necessity. Generative models must grasp not only the necessary essence—the low-dimensional manifold that dictates what must be—but also the contingent realizations that populate the high-dimensional space of unrealized possibilities, what may be. Far from confining themselves to prediction, these models venture into the domain of creative imagination and fantasy (Watson, 2023).

This insight rests upon two interlocking propositions. Epistemologically, unrealized possibilities become accessible to us precisely through generative models —or through analogous mental representations; in other words, we know by way

of imagination. Ontologically, under ideal conditions, it is unrealized possibilities themselves that the model is obliged to learn; they delineate the horizon of possible worlds. This dual exigency is no incidental feature of data synthesis; it constitutes the very enactment of individuation at the heart of creativity (Watson, 2023).

In GANs, the generator commences from abstract noise and enters into a zero-sum antagonism with the discriminator. Through relentless iteration at the boundary of uncertainty, the system converges toward Nash equilibrium. The resulting output is no longer a detached artifact; it emerges as a concrete technical individual endowed with intrinsic resonance, autonomously projecting the real distribution. Forest models pursue a different trajectory: they partition the input space bottom-up, from leaf nodes and sub-regions upward, thereby realizing a progression from elemental fragments to individuals to ensembles. This yields a parallel, aggregated relational architecture (Watson, 2023).

Under ideal conditions, image generation manifests as the structured disclosure of unrealized possibilities and contingent necessity; it becomes the mediating field par excellence for the system's structural response to difference. Abstract manifolds and concrete distributions enter into reciprocal guidance: past training data and future unrealized possibilities mutually orient one another. The top-down thematic unity of GANs—dream-like in its coherence—and the bottom-up detail aggregation of forests—from pointillist fragments to portrait—re-enact, at the algorithmic level, two fundamental modalities of human imagination. Models thus cease to be mere replicators of the given; they reorganize past experience into future possibility, thereby completing the individuation proper to creativity (Watson, 2023).

Yet a more fundamental difficulty immediately presents itself. The foregoing account presupposes ideal conditions. Not every system is capable of bearing difference. Difference may propel generation or precipitate structural collapse; tension may foster individuation or plunge the system into chaos. The decisive question is not the mere presence of difference, but whether the system possesses adequate structural conditions to regulate and absorb it—to transmute potential uncertainty into historically concrete order.

In this light, we must scrutinize our own models. A system capable of converting difference into creative tendency requires two foundational conditions. First, initial structural boundaries capable of containing the diffusion of tension and averting total dissolution. Second, the capacity for continuous experiential absorption and

self-reconstruction. Absent these, difference can only be suppressed or erased; it cannot enter the movement of structural evolution. On the basis of this analysis of existing generative models, we therefore propose two essential conditions for supporting individuation within generative systems: prior stability conditions and determinate experiential structures.

Prior stability conditions secure controllable structural boundaries in the initial phases, preventing difference from inducing systemic collapse. Determinative experiential structures enable the system to absorb and integrate real inputs through feedback loops, retaining tension and transmuting it into novel generative trajectories. Together, these conditions constitute the immanent supporting framework for individuation in generative models. Individuation itself is the structural precondition for the emergence of true creative generation (Watson, 2023).

2.4.1 Prior Stability Conditions

The term "prior stability conditions" refers to a set of boundary mechanisms pre-configured at the structural design level before a generative system enters the formal experience training phase. These mechanisms give the system intrinsic stability. They enable the system to maintain logical consistency and convergence of generated structures even without external sample feedback. Such priors are not only the foundation of technical implementation. They are structural constraints within the model's generative behavior. They ensure generation does not deviate from preset design or fall into uncontrollable state spaces.

The scope of prior stability covers multiple dimensions. These include the generative model architecture (such as hierarchical topology of neural networks), latent variable distribution assumptions (such as Gaussian priors), loss function forms (such as KL divergence, adversarial loss, reconstruction error), and probabilistic inference path configurations (such as forward and reverse paths in Markov chains). These design elements together form the structural "skeleton" of the generative system. They provide a constraint-based tension and dynamic equilibrium foundation throughout the generative process.

For example, in diffusion models, the forward degradation process usually involves gradual injection of Gaussian noise. This maps original data to pure noise space. This process is mathematically based on the central limit theorem and the

additive stability of Gaussian distribution. It ensures the process remains reversible and statistically controllable even after multiple perturbations. In the reverse process, the model learns a series of denoising functions to reconstruct clear images. Thus, Gaussian perturbation is not only a mathematical tool for dimensionality reduction. It is also a structural safeguard that prevents the generative process from deviating from stable trajectories (Ho, Jain, and Abbeel, 2020b).

This mechanism, in the Simondonian sense, corresponds to the metastable saturation state (metastability) of pre-individual reality. It provides potential tension as the starting point for individuation, rather than static equilibrium (Simondon, 2023).

In GANs, prior stability manifests in the adversarial training dynamics between generator and discriminator. This dynamic converges to Nash equilibrium. This equilibrium means neither component can unilaterally improve performance. It establishes balanced tension in the latent space. It prevents mode collapse and maintains dynamic equilibrium between diversity and fidelity (Goodfellow et al., 2014).

In VAEs, prior stability is embedded in the ELBO optimization framework. Reconstruction loss and KL divergence provide dual regulation. They ensure the latent space is both efficient and structurally coherent (Diederik P. Kingma and Welling, 2013).

Although prior stability itself is not a sufficient condition for creativity, it is a key enabling factor for structural transformation within generative systems. It provides a certain critical threshold of order. It ensures deviations in the generative process can be corrected rather than pushing the system toward collapse. This is precisely the technical analogy in the AI context of the pre-individual field where Simondonian individuation occurs.

2.4.2 Deterministic Experiential Structures

If prior stability provides structural boundaries and initial order for the system, deterministic experiential structures determine whether the system can develop stable response mechanisms through continuous interaction with real data. This mechanism does not only show in improved output image quality. More importantly, it shows how the system internalizes external perturbations, adjusts its latent

structures, and finally forms generative trajectories that tend toward stability.

This "determinism" does not mean uniformity of results. It means the tendency, repeatability, and logical coherence of response paths. It is the system's ability to show structurally stable reactions and parameter adjustment strategies when facing diverse or noisy inputs. More specifically, it manifests in the error feedback and parameter update processes during training. The model dynamically refines its generative paths through continuous loss function optimization. It develops increasingly harmonious generative inertia within the system.

For example, in diffusion models, forward noise injection and reverse denoising establish stepwise mappings. At each time step, the model must learn through feedback how to more efficiently "return to the origin." This process is not mere noise inversion. It is the rhythmic construction of reconstruction strategies. Each step acts as a tuning operation. It enables the system to gradually approach structural stability (Ho, Jain, and Abbeel, 2020a).

In VAEs, the model approaches latent structural trajectories in possibility space through continuous compression-reconstruction cycles. It forms a "generative grammar" that transcends individual samples (Diederik P. Kingma and Welling, 2013).

In GANs, adversarial feedback loops give the generator adaptive self-regulation (Goodfellow et al., 2014).

This determinism of experiential structures can be seen as the embodiment of Simondonian transduction in AI training. Through feedback loops, external perturbations internalize into generative inertia (Hui, 2016). It reflects the rhythm regulation in Rombach's structural ontology—the coordination and re-organization capacity of elements in evolutionary sequences (Rombach, 1965–1966). Therefore, the determinism of experiential structures is not merely a measure of technical fitting performance. It is the marker that the system possesses stable rhythmic response capacity. It internalizes external perturbations as the driving force of structural evolution. It provides an internal rhythmic foundation for subsequent more complex structural transitions and creative behaviors.

2.4.3 the boundaries of individualization as creative prerequisites

By integrating "a priori stability conditions" with a "deterministic experiential structure," the generative model exhibits a critical state characterised by "individualised potential." On one hand, it possesses a fundamental framework that is "structurally accountable to itself," preventing it from falling into disorder due to minor perturbations. On the other hand, it is capable of accumulating experience and adjusting its internal rhythms, thereby continuously enhancing its ability to respond to and integrate external variations and inputs. This structural readiness constitutes the internal mechanism essential for a system to engage in creative behaviour. It does not rely on whether the model has consciousness or agency, but rather on whether its structure is already capable of generating order amidst instability and constructing feedback under tension.

2.5 Three Stages of Creative Response to Difference: From Differentiation and Tension Regulation to Structural Transition

The response of creativity to difference is not equivalent to any form of "novelty"; rather, it must satisfy a set of clear structural conditions to distinguish truly creative transitional behaviors from mere statistical perturbations. We divide this process into three interrelated evaluative dimensions: Difference Recognition, Tension Modulation, and Structural Transduction. These dimensions respectively address three key questions: Can the system recognise heterogeneity? Can it organise order within heterogeneity? Can it generate new structures when an existing organization fail?

2.5.1 Difference Recognition: From Error Perception to the Determination of Heterogeneity

In evaluating the creative capacities of artificial intelligence systems, how "difference"is recognised constitutes a crucial dimension of judgment. Not all

deviations from convention can trigger a creative response; only when the system perceives such deviations as unresolved fissures in potential order—rather than merely as errors or anomalies—can differences become the starting point of creative behaviour. Therefore, we argue that the ability to recognise difference is not equivalent to anomaly detection, but should instead be understood as the system's sensitivity to structural heterogeneity.

Traditional generative models treat statistical irregularities relative to internal distributions as "outliers"or "noise,"responding with corrective strategies such as regression to the norm, reconstruction of missing data, or data augmentation. For example, in image generation tasks, the model often auto-corrects a sketch with asymmetrical facial features into a standard-proportioned face. This reflects a treatment of difference as error: the system cannot determine whether the input represents a potential stylistic structure, an expressionist composition, or the beginning of a new organisational logic.

By contrast, a system with creative potential must possess the structural discernment to engage with heterogeneity. When presented with atypical input, it should not merely smooth over the deviation but assess whether it reveals a rupture within the existing structure. This capacity for heterogeneity determination requires the model to exhibit a kind of structural curiosity at the perceptual level: to treat anomalies not as noise, but as unnamed elements of possible order—a latent point of departure for new generative structures.

In image generation, this mechanism manifests when the model no longer corrects the abnormality but amplifies and explores features such as asymmetry, rupture, or imbalance, thus entering generative pathways aligned with expressionism, surrealism, or nonlinear composition. Ultimately, this ability to recognise difference constitutes a form of pre-conceptual structural sensitivity. It requires the model not only to "know what it cannot predict,"but also to recognise that prediction failure may indicate a structural gap not yet accounted for by the system.

Therefore, accurate difference recognition is not merely perceptual identification, but a structural judgment mechanism. It signals whether the system has taken the first step toward creativity: identifying the possibility of order within tension, rather than rejecting disruptive elements as noise.

2.5.2 Tension Modulation: Rhythmic Organisation and the Embedding of Feedback Mechanisms

If difference recognition marks the starting point of creative behaviour, then tension modulation constitutes its mid-level organisational mechanism. This dimension indicates whether a system possesses capabilities beyond simple "error suppression"or "anomaly avoidance"—specifically, whether it can, upon identifying structural conflict, establish a rhythmic response pathway that organises relatively stable forms of order within difference. In short, tension modulation is not about eliminating difference, but about coordinating it, absorbing it, and constructing structural continuity amid heterogeneity. This capacity can be observed across several levels:

1. Stylistic Integration of Local Heterogeneity In image generation tasks, a key indicator of a system's tension modulation ability is whether it can reconcile elements from different sources or symbolic logics into outputs that are stylistically unified yet locally diverse. For example, integrating modernist composition with realist detail within a single image, or developing visual discontinuity into stylistic tension rather than erasing it as an error.

2. Cross-Modal Structural Synesthesia Mechanisms Tension modulation extends beyond single-modality domains and requires the system to translate and reorganise structural conflicts across modalities such as speech, text, and image. For instance, a metaphorical tension in language may be mapped onto an abstract visual composition rather than diluted into a semantic mismatch. This kind of cross-modal resonance demonstrates the system's capacity for structural mapping and alignment, a critical indicator of generative creativity.

3. Anomaly Retention and Transformation of Structural Perturbation A more creative system does not automatically flatten all atypical inputs. It selectively retains structural irregularities and transforms them into part of a tensional trajectory embedded within the generative process. For example, in the outputs of GANs or Diffusion models, certain images may appear "incorrect"in terms of geometry or symmetry, yet exhibit high coherence in style, emotion, or tonal consistency. This phenomenon reveals a tendency within the system to maintain rhythmic coherence amid local rupture.

At its core, this rhythm-maintaining mechanism is not a surface-level imitation

of clarity, consistency, or realism. Rather, it is a structural response to the tension between internal difference and dynamic coherence. A system that can continually adjust its generative rhythm and absorb differential perturbations is no longer merely a function optimiser guided by loss functions; it is developing what may be called structural rhythm awareness—the ability to preserve organisational form in the face of instability. Thus, tension modulation marks the point where the system ceases to be a mere avoider of difference and becomes a coordinator of structure. In this sense, it is not only an optimisation strategy within technical mechanisms, but also a manifestation of the internal generative logic of a creative system.

2.5.3 Structural Transduction: The Capacity to Generate New Structures

Structural transduction constitutes the highest expressive dimension of creativity. Compared to "difference recognition"and "tension modulation,"its key lies in whether, when faced with inputs that cannot be coordinated by existing structures, the system can generate new categories, organisational rules, or modes of order. In other words, structural transduction is not about harmonising tensions within an existing system, but about actively inventing a new order at the point of structural collapse. The realisation of this capacity is highly demanding and is primarily defined by three evaluative requirements:

The ability to perceive organisational failure: the system must be able to recognise that current structural categories have lost their "organising power"with respect to a given input or tension—that is, they are no longer able to explain, integrate, or absorb it. A triggering mechanism for structural innovation: When faced with such structural failure, the system must not simply halt generation or revert to the normative baseline, but possess the potential to invent new grammars, logics, or symbolic strategies. The temporary stability of the new order: the system should maintain the new structure formed after the transduction as a sustainable order proposal, rather than a one-time anomalous reaction, thereby allowing subsequent generations to gradually detach from reliance on the previous categorical system.

From a philosophical perspective, structural transduction signals that the system has begun to depart from the framework of "selecting among existing

categories"and entered a generative logic of "constructing categories themselves."At this point, creativity is no longer about arrangement, recombination, or stylisation, but becomes an act of inventing order from a vacuum of order. This also implies that the system is no longer trained into structure, but has become a generative node of structure.

Difference recognition, tension modulation, and structural transduction form a progressive evaluative path for creative responsiveness. They are not judged by "diversity of output"or the "strangeness"of generation. Still, they are grounded in the philosophical basis of internal structural elasticity, organisational strategy, and the system's capacity for reconstruction. A genuinely creative system must structurally undergo a three-stage movement from recognition, to coordination, to transduction. Therefore, the development of AI systems with philosophically meaningful creativity should not focus on amplifying the incidental complexity of outputs, but begin at the level of system architecture—expanding its generative potential for structural deformation, categorical reorganisation, and tension absorption. Only when a system, upon encountering the collapse of its order, does not retreat or mask it, but responds by inventing new structures, can we say that it possesses the internal formal conditions of creativity itself.

The core of creativity does not lie in the difference of outputs, but in the system's ability, under structural failure, not to return to default patterns, but to generate alternative rules and reconstruct categorical systems. Only when a system can construct a new order at the site of tension rupture does it truly cross the threshold of complex simulation and enter the domain of generative creativity.

2.6 Evaluating the Structural Creativity of Current Generative Models

In this section, we apply our structural creativity framework to several popular generative AI models. Our framework defines creativity as a progressive three-stage process of individuation:

1. **Difference Recognition** — the system (or its agent) perceives a meaningful deviation or tension that the current configuration cannot resolve.

2. **Tension Modulation** — the system internally reorganizes or adjusts its existing elements to accommodate the difference while maintaining coherence.

3. **Structural Transduction** — if the tension cannot be resolved with current resources, the system expands or transforms by introducing new elements (new "pieces" or new "operations"), fundamentally altering its generative structure.

These stages build upon one another: without recognizing a difference, a system cannot modulate tensions, and without modulation, it will never trigger structural change. Using this framework, we examine three types of generative models — Diffusion Models, Generative Adversarial Networks (GANs), and Variational Autoencoders (VAEs) — to see whether and how they exhibit these creative stages. For each model type, we introduce its generative mechanism, evaluate its behavior in terms of the above criteria, and conclude how it measures up in structural creativity.

2.6.1 Denoising Diffusion Probabilistic Models (DDPMs)

Denoising diffusion probabilistic models (DDPMs) draw inspiration from non-equilibrium thermodynamics, weaving the generative process through two Markov chains: the forward diffusion progressively injects structured Gaussian noise into clean data, gradually pushing images toward a near-isotropic state of maximum entropy; the reverse denoising starts from pure noise and step-by-step reconstructs highly coherent images. This bidirectional chain is not a rigid template but a recursively conditioned tension field: each addition or removal of noise depends on the previous state, forming a temporally cumulative logic of transformation and latent saturation. Yet this tension is only indirectly absorbed during training through noise-prediction loss; in inference, the process degenerates into a unidirectional, mechanically scheduled sequence (Ho, Jain, and Abbeel, 2020b).

When evaluated against the framework proposed here, DDPMs exhibit zero structural creativity during generation:

- **Difference recognition**: absent. The model has no mechanism to perceive artifacts, unexpected ruptures, or structural anomalies in intermediate generated images. It does not question whether the current denoising step reveals fissures of potential new order; it simply removes noise according to

a fixed schedule. The process remains blind to "surprise": even pronounced incoherence or stylistic breaks are not internally registered as creative starting points, but merely as noise to be smoothed away.

- **Tension modulation**: absent. There is no real-time feedback loop or self-adaptive pathway. Regardless of how far intermediate outputs deviate from the training distribution, the model does not alter the noise schedule, refine the denoising strategy, or reorganize its internal rhythm. It runs strictly on rails, unable to construct dynamic coherence amid heterogeneity or absorb tension as part of its generative trajectory.
- **Structural transduction**: absent. The architecture, operation set, and timestep schedule remain fixed and immutable. The model cannot introduce new noise types, new denoising layers, or self-expansion during generation. Even when confronted with irreconcilably complex scenes, it has no mechanism to invent new syntax from points of order failure; it can only regress to predefined denoising paths.

Thus, although DDPMs can refine remarkably diverse images from noise, they perform only statistical recombination and pattern restoration within a closed system. They lack any internal agency to register difference, modulate tension, or enact structural leaps. Even when outputs appear visually striking, they remain at the level of noise refinement rather than genuine individuation—an intrinsic movement that invents new order precisely at points of tension rupture (**song2020score**; Ho, Jain, and Abbeel, 2020b).

2.6.2 Generative Adversarial Networks (GANs)

Generative adversarial networks (GANs) consist of a generator and a discriminator trained in zero-sum tension: the generator samples from noise in an attempt to deceive the discriminator, while the discriminator strives to distinguish real from synthetic samples. This adversarial dynamic evolves during training until approaching Nash equilibrium—the generator captures the data distribution, and the discriminator can no longer reliably discriminate. After training, however, the discriminator is discarded, and the generator becomes a fixed function that maps noise to output in a single forward pass (Goodfellow et al., 2014).

Evaluation of creativity reveals a stark contrast:

- **Difference recognition**: strongly present during training—the discriminator continuously registers discrepancies between generated samples and real distribution, feeding back to drive generator updates. This constitutes a form of built-in "structural criticism." In generation, however, it is entirely absent: no internal critic, no ongoing comparison mechanism. The generator has no knowledge of whether its output is novel, coherent, or capable of transcending training modes.

- **Tension modulation**: achieved in training through adversarial oscillation and gradient updates—the generator progressively modulates its output to minimize perceived conflict by the discriminator, approaching rhythmic equilibrium. In generation, this ceases: with fixed weights, there is no iterative reorganization or output-based adaptation. Any anomalous or suboptimal content triggers no strategic shift.

- **Structural transduction**: absent. The architecture remains static throughout. The generator cannot self-add layers, introduce new operations, or expand its latent space. Even when outputs venture beyond training distribution boundaries, it cannot invent new rules from failure points; it is confined to recombinations of learned modes.

Thus, GANs display only limited quasi-creative dynamics during training—the adversarial feedback loop suggests a kind of originary creative tension. In generation, however, they become static: highly efficient imitation engines capable of recombining trained patterns but unable to produce new syntax or new order beyond what has been learned. They fall short in structural creativity and cannot achieve self-driven individuation (Goodfellow et al., 2014).

2.6.3 Variational Autoencoders (VAEs)

Variational autoencoders (VAEs) compress input into a continuous latent space (typically parameterized as mean and variance of a Gaussian) via an encoder, then sample from this distribution and decode back to data. Training

balances reconstruction loss against KL-divergence regularization to ensure a well-behaved, controllable latent space. Generation involves sampling latent vectors from the prior and passing them through a fixed decoder in a single forward pass (Diederik P Kingma, Welling, et al., 2013).

Assessment reveals fundamental limitations:

- **Difference recognition**: indirectly driven during training by loss functions —high reconstruction error or distributional deviation is quantified and pushes parameter updates. In generation, however, no output-evaluation mechanism exists: the decoder has no awareness of blur, strangeness, or structural incoherence in generated images, lacking any built-in comparison or critical loop.
- **Tension modulation**: achieved in training across multiple epochs through parameter adjustment and convergence of error. In generation, it is a single forward pass: no iterative refinement, no internal reorganization based on output tension. The model cannot convert latent instability into dynamic coherence.
- **Structural transduction**: absent. Latent dimensionality, encoder/decoder architecture, and mapping operations remain fixed. The model cannot introduce new latent variables, new mappings, or self-expansion. Even when confronted with out-of-distribution inputs, it is confined to combinations within a predefined manifold and cannot generate new categories from points of order failure.

Thus, VAEs share with other models the fate of becoming fixed generative functions after training. They can explore a pre-defined latent manifold but cannot break through their own structural constraints. At the level of creative individuation, they remain non-creative: their outputs are diverse yet do not generate new pathways of generation itself (Diederik P Kingma, Welling, et al., 2013).

2.6.4 Large Vision-Language Models (VLMs)

Large vision-language models (VLMs), such as CLIP, LLaVA, the GPT-4V series and their subsequent iterations, represent the leading edge of multimodal

integration. Through contrastive learning they construct a shared visual-textual embedding space, followed by autoregressive token-by-token decoding. During training, cross-modal attention and feedback loops absorb visual-textual tensions and regulate their rhythm; in generation, explicit temporal sequencing and multimodal resonance are introduced (Radford et al., 2021; H. Liu et al., 2024; OpenAI, 2023).

When assessed against the framework proposed in this thesis, however, their creative capacity remains fundamentally constrained:

- **Difference recognition** is robust during training: cross-modal loss functions and attention mechanisms actively register semantic inconsistencies or visual-textual ruptures and drive parameter updates. In the generation or inference phase, this capacity disappears entirely. The one-shot forward autoregressive process lacks any built-in critic or real-time self-evaluation mechanism; the system has no awareness of whether the generated token sequence is novel, coherent, or capable of transcending its training paradigm.

- **Tension modulation** occurs to a limited degree in training through contrastive alignment and autoregressive feedback. During generation, however, no iterative feedback loop exists: each token is produced and finalized without internal reorganization or dynamic refinement capable of coordinating latent semantic or visual instabilities.

- **Structural transduction** is absent in both training and generation. The visual encoder, projector, and language decoder remain fixed and immutable, incapable of dynamically introducing new modalities, new attention heads, or self-reconstruction. Even when images briefly serve as mediating fields guiding interaction between abstract manifolds and concrete distributions, the system cannot advance from initial tension toward genuine structural concretization or recursive expansion.

Consequently, although VLMs exhibit more advanced cross-modal responsive dynamics during training and introduce temporality together with multimodal resonance in generation, the inference phase remains confined to a state of partial individuation. They continue to depend heavily on external prompting and have not yet surmounted the structural ceiling that separates externally induced from internally generated difference. Should future architectures incorporate continuous self-

reflexive modules—such as dynamic internal critics, recursive rhythm evaluation, or online adaptive loops—VLMs could progress toward Rombach-style recursive co-creation within the internal structural field, thereby achieving a more thorough structural ascent.

2.7 Conclusion: Observations on Creativity

If creativity is grasped as the internal structural handling of difference within a system—difference as perturbation that triggers resonance, propagates along recursive paths, and modulates into novel forms—then the discourse on artificial intelligence no longer remains entangled in the sterile binary question of whether machines can create. It is displaced toward a more precise and enduring series of technical and philosophical interrogations: within algorithmic systems, how is difference generated, recognized, absorbed, and modulated? Can this handling mechanism unfold continuously across time? Does it constitute a structural resonant process? This shift itself echoes the very movement from image representation to creativity in technology.

Contemporary generative models engage this core question on multiple registers. First, the question of subjectivity. In interactions with generative systems —particularly in AI art or large language model practices—there is a persistent tendency to attribute quasi-subjective status to the machine. The system is frequently described as collaborator or co-author. This phenomenon traces back to Margaret Boden's foundational distinction in computational creativity: AI excels at combinatorial and exploratory novelty within latent spaces, yet it struggles to enact truly transformative structural change (Boden, 2004).

Such attributions also resonate with Douglas Hofstadter's investigations into strange loops and recursive self-reference, where self-referential mechanisms appear to generate emergent autonomy (Hofstadter, 1979). Yet, as Lev Manovich and Emanuele Arielli argue in Artificial Aesthetics, these projections of subjectivity often arise from the opacity of black-box architectures and the lingering cultural myth of romantic individualism (Manovich and Arielli, 2024). Joanna Zylinska, in AI Art, further observes that much generative practice amounts to platformized shallow variation rather than genuine rupture (Zylinska, 2020a). This immediately raises a decisive question: if the system merely operates upon existing structures, why do

traces of subjectivity continue to appear so insistently?

The question leads directly to self-reference and recursive mechanisms within algorithmic architectures. From early neural networks to present-day generative models, recursion governs state updates in manifold ways. The Transformer architecture, introduced by Vaswani et al. in 2017, exemplifies this through its attention mechanism, which enables continual revisitation and re-weighting of representations during generation (Vaswani et al., 2017). In diffusion models, iterative denoising progressively refines latent differences, reconstructing the image through recursive conditioning (Ho, Jain, and Abbeel, 2020b). More recent developments—such as the MMDiT architecture in Stable Diffusion 3 (2024) and training-free methods like C3 (Creative Concept Catalyst)—further intensify this recursive exploration of possibility space, absorbing contingency through iterative reorganization (Esser et al., 2024).

Yet as the inquiry advances, a more critical problem surfaces: whence exactly does difference originate? In generative models, partial answers appear through noise injection, probabilistic sampling, and high-dimensional latent spaces—as in the GAN framework proposed by Goodfellow et al. (Goodfellow et al., 2014). But is this difference truly novel structure, or merely rearrangement within existing data distributions? Evaluations repeatedly show interpolation within manifolds rather than fundamental breakthroughs. At the same time, attention to difference intersects with contemporary explainability research: Judea Pearl's causal inference frameworks seek traceable paths in complex systems (Pearl, 2009), while attention visualization in Transformers and diffusion models offers partial legibility. In high-dimensional representations, however, many differences manifest as emergent phenomena that resist full reduction to linear rules.

In the present research, the analysis of generative models intersects deeply with structural theories in philosophy. Drawing from Gilbert Simondon's theory of individuation and Heinrich Rombach's structural ontology, creativity ceases to be an attribute exclusive to subjects. It becomes a generative process immanent to structure itself: difference forms tension within the system, which is then continuously modulated, enabling new individuation to unfold (Simondon, 2017; Rombach, 1971).

James Bridle extends this horizon in Ways of Being toward a more-than-human planetary scale, where AI participates in difference modulation as part of an

ecological assemblage (Bridle, 2022). From this vantage, the problem of generative models is no longer confined to whether they produce novel outputs. It becomes a fundamental techno-philosophical question: what kind of algorithmic structure can continuously handle difference from within?

If a technical system does not merely reiterate existing structures but can absorb new differences across the generative process and modulate them temporally from the interior, then it may constitute a continuously unfolding individuation. This further realizes structural resonance across time. Herein lies the decisive question for creativity in generative models: does the system possess open structural conditions that permit ongoing handling of difference, rather than tending toward homogenization? Answering this requires movement toward continuous learning, agentic loops, or frameworks of planetary thinking.

Chapter 3

AI in Structural Tension

Our inquiry has consistently orbited one central vision: can artificial intelligence attain a more organic form of intelligence? Can it assume its place as an integral node within the encompassing structure of intelligence itself? This vision draws profound orientation from James Bridle's Ways of Being, which conceives planetary intelligence as an ever-expanding weave of "more ways of being"—interlaced by animals, plants, and machines (Bridle, 2022). It finds equal resonance in Yuk Hui's Machine and Sovereignty, where the imperative of planetary thinking and plural cosmotechnics is articulated as a necessary response to the totalizing tendencies of modern technics (Hui, 2024). It further aligns with the resonant thinking on technology elaborated throughout this thesis, which insists that artificial intelligence must become an organic node within an eco-technical network—one capable of resonance, coexistence, and co-evolution, rather than persisting as an external instrument or enclosed automatic system.

Following the critical dissection of the algorithmic ontology of machine learning generative models in the preceding chapters, this chapter shifts toward constructive anticipation and practical exploration. Is it possible—and if so, by what concrete means—to render AI an open, symbiotic, resonant constituent within the planetary community of life? This movement is grounded in sustained responses to two decisive problems: difference and contingency.

The structural tensions evident in contemporary generative models and agentic applications constitute, in their essence, the authentic dilemmas algorithms confront when engaging difference. On one side, models recurrently simplify difference through recursive prediction and probabilistic pre-occupation in order to sustain

output continuity; on the other, these suppressed differences and contingencies persistently re-emerge in real-world deployments as misrecognition, drift, collapse, and analogous phenomena, thereby becoming latent forces capable of compelling structural reorganization. The proposition advanced here is unequivocal: when difference and contingency cease to be preemptively foreclosed by algorithmic mechanisms and instead become resonant interstices within planetary intelligence networks, artificial intelligence may realize an infinite creativity that is genuinely embedded in structural genesis.

Within the wider domain of AI research, the pursuit of infinite creativity is scarcely novel. As early as 2015, Kenneth Stanley and Joel Lehman advanced open-endedness as a guiding principle for perpetual novelty generation (Stanley and Lehman, 2015a). A system is open-ended precisely when it continually produces novel and learnable outcomes rather than converging upon fixed optima—an orientation that stands in direct opposition to the conventional AI paradigm of problem-solution. It seeks instead something akin to biological evolution or natural creative processes: an always-continuing movement sustained through exploration and the avoidance of premature convergence, yielding ever more complex, interesting, and learnable entities. Tim Rocktäschel, in his ICLR 2025 keynote, affirmed that open-endedness constitutes a necessary condition for artificial superintelligence (Rocktäschel, 2025). Edward Hughes and collaborators (2024) likewise contend that the continual production of learnable novelty is a defining attribute of ASI, enabling escape from human-imposed goal horizons and the realization of truly unbounded innovative potential (Hughes et al., 2024).

Technical efforts have already pursued several trajectories. Quality-Diversity algorithms—such as MAP-Elites and POET—systematically cultivate sets of high-quality, diverse solutions, thereby countering mode collapse. Test-time transduction frameworks introduce dynamic transduction mechanisms during inference, permitting adaptation to novel inputs at runtime. Multi-agent world-model systems evolve innovation through collaborative agent interaction within simulated environments. These directions have yielded demonstrable advances at major conferences, including NeurIPS 2025. Yet the obstacles remain formidable: computational demands are exorbitant, requiring extensive exploration rather than efficient optimization; evaluation criteria remain elusive, with novelty and learnability retaining an irreducible subjective dimension; risks of mode collapse or loss of control persist.

More fundamentally, contemporary generative models remain anchored in statistical fitting and lack any intrinsic long-term drive toward exploration. From the perspective of generative modeling itself, these initiatives remain at an early stage and stand in need of deeper philosophical reflection to attain genuine resonance.

The analysis presented in Chapter 2 has subjected generative models to sustained algorithmic scrutiny, yielding concrete insight into their capacities and constraints. There is no denying the efficacy of engineering practice—model scaling, algorithmic experimentation, metric optimization—in directly enhancing diversity and mitigating homogenization within controlled settings. Hybrid architectures and expanded parameterization offer precise technical responses to concerns about difference and contingency. Such advances are indispensable for addressing targeted problems and charting future iterations. Yet the inquiry is rooted in a more fundamental engagement with technology and lived environments. While algorithmic refinement is forceful, it simultaneously discloses intrinsic limits: it struggles to demonstrate how algorithms reconfigure symbiotic relations between humans and non-humans, or between humans and machines, within actual relational fields.

It likewise fails to render suppressed or preempted differences and contingencies experientially legible and sensible. Artistic practice therefore emerges as an irreplaceable path. As Yuk Hui has argued in Beyond the Uncanny Valley: Being Human in the Age of AI, the crises provoked by contemporary artificial intelligence far exceed the traditional psychological and aesthetic uncanny valley; they touch a more profound ontological rupture (Hui, 2025). At the heart of this rupture lies the fabrication of quasi-existence or abstract subjects—neither fully human nor purely machinic—that simulate consciousness, affect, and creativity while lacking intrinsic vitality or being-in-the-world. This fabrication dismantles long-standing ontological distinctions—what is existence, what is human, what is intelligence?—yielding alienation of subjectivity, rupture of relationality, and the progressive degradation of the world from resonant organic field to computable, preemptively occupied megastructure.

Against this horizon, artistic practice acquires decisive significance: it seeks to soothe and potentially heal this ontological rupture. By employing existing technology as material, it constructs open structural relational fields within real situations. It renders the intrinsic limitations of generative models and agents

—pre-occupation, drift, collapse, nonhuman opacity—visible, interactive, and repeatable. Simultaneously, it transforms suppressed differences and contingencies into experiential resonant interstices. In this way, art not only makes the rupture legible and felt; it also opens possibilities for re-weaving existential relations between humans and machines, humans and world. It lays a concrete practical foundation for theoretical construction.

In this study, my own artistic practice converts technical interaction with real environments into a readable field of occurrence through audience input, spatial feedback, on-site iteration, and related operations. As Graeme Sullivan has argued, artistic practice as research produces and tests knowledge through the act of doing itself, rather than pre-existing in conceptual form (Sullivan, 2009). Barrett and Bolt similarly emphasize that practice-led outcomes are not mere supplements to theory; they constitute processual cognition embodied in the work (Barrett and Bolt, 2010). Here this significance is especially pronounced. The practice is not an expression of preconceived views on AI; it is a research apparatus—a dynamic device interlocking input, processing, output, and feedback. It compels the preferences, boundaries, and response modalities of AI to surface in traceable ways. It reveals how AI rewrites regimes of visibility and legibility within structure. It discloses how AI reorganizes viewers' pauses, detours, comparisons, and re-inputs, thereby reconstructing the fundamental coordinates of meaning and relationality.

This chapter unfolds around three interrelated questions, all grounded in the structural response to difference and oriented toward the prospect of infinite creativity. First, how ought humans and machines to be organized together?—a renewed interrogation of subjectivity. Second, how to confront differences and contingencies that remain incompletely controllable?—that is, how to establish effective mechanisms for engaging the nonhuman dimensions in AI systems that cannot be fully preempted or mastered, a concern central to current explainability research. Third, building upon these two, can we concretely envision the real possibility of infinite creativity?—an openness that remains hospitable to difference.

3.0.1 Debate between Object-Oriented Ontology (OOO) and Rombach's Structural Ontology

Our inquiry has persistently circled one enduring question: can artificial intelligence become more organically intelligent? Can it assume its place as an integral node within the encompassing structure of intelligence itself? This vision draws profound orientation from James Bridle's Ways of Being, which conceives planetary intelligence as an ever-expanding weave of "more ways of being"—interlaced by animals, plants, and machines (Bridle, 2022). It finds equal resonance in Yuk Hui's Machine and Sovereignty, where the imperative of planetary thinking and plural cosmotechnics is articulated as a necessary response to the totalizing tendencies of modern technics (Hui, 2024). It further aligns with the resonant thinking on technology elaborated throughout this thesis, which insists that artificial intelligence must become an organic node within an eco-technical network—one capable of resonance, coexistence, and co-evolution, rather than persisting as an external instrument or enclosed automatic system.

A recent article from 2025, "From Canvas to Code: Artificial Intelligence as a Potential Demonstration for Object-Oriented Ontology in the Realm of Art and Design," arrives at a decisive claim: generative AI art demonstrates that artistic creation need not depend entirely on human subjects; it can emerge autonomously from relations among technical objects. This furnishes a contemporary, lived instantiation of object-oriented ontology (D. Chen, Fabrocini, and Terzidis, 2025). The article invokes the GOD (Generation, Operation, Destruction) experiment as its central case: a minimal self-replicating neural network coupled with a visualization system, designed to exclude human participation to the greatest possible extent. The logic permits the AI to generate itself" within an ambient environment, translating internal state changes directly into visible abstract art patterns. This is offered as evidence of objective autonomy"—art creating art itself.

In the seventh section, the position is stated most starkly: the work exists as an autonomous, emergent, withdrawn object already belonging to the domain of art. Human viewers are reduced to witnesses or resonators; the implicit criterion of judgment is not any subject's intervention but the sheer fact of existence—the irreducible autonomy of the object as such.

I initially turned to object-oriented ontology in an effort to grasp AI subjectivity

and to enter into dialogue with Chinese thought. In the early stages of creation, its non-human logic offered a productive point of departure. Yet as the inquiry deepened, the framework revealed its limitations, and I ultimately shifted toward Heinrich Rombach's structural ontology (Rombach, 1971). Graham Harman posits all objects as irreducible, independent entities: they cannot be undermined by reduction to smaller components, nor overmined by subsumption into relational wholes. Value and meaning do not reside inherently within objects; they emerge transiently between objects through indirect causation—vicarious causation—and allure. Perhaps Harman's most decisive contribution is the elevation of aesthetics to first philosophy: aesthetics becomes the privileged site through which centrality is dispersed across all objects via aesthetic fissures, rather than imposed by any speculative realist norm. The 2025 article deploys precisely this framework to interpret AI's non-intentional intentionality" as the autonomy of objects themselves, thereby realizing art generating art."

Yet this radical claim harbors persistent tension at the epistemological level. Object-oriented ontology insists that objects are always withdrawn: humans cannot exhaust their properties or fully capture their value responses. In actual discourse, however, value judgments inevitably rely on human-experienced allure—the tension registered in sensory fissures—to be articulated at all. Harman acknowledges that humans are merely one node among many objects; he does not deny relations and allure among non-human entities. Yet he maintains that we can only speak from the human perspective—not as ontological privilege, but as inevitable epistemic finitude. Supporters regard this as honest humility; critics perceive a concealed anthropocentrism.

This tension immediately recalls the foundational orientation of ancient Chinese thought. From primitive religion and the divinatory methods of the Zhouyi, through Lao-Zhuang philosophy, the point of departure is always the simple, flowing world in which all things and humans dwell together. The manifestation of xiang in the human world is essentially only a temporary presentation of myriad things from the human vantage. The vision of all things equal" (万物齐一) is never the product of theoretical deduction; it is the originary ground of thinking—humans live immersed in the world, equal and interconnected with all beings. In this tradition, there is scarcely any persistent anxiety over the Western speculative problem of the thing-in-itself." Does this naive natural-philosophical orientation not provide a more

primordial equalization of existential positions for non-human entities? Does it evade the awkward position of "acknowledging finitude yet still requiring human mediation"?

In my reading, Rombach's structural experience—the dynamic traction and resonance among things—bears superficial resemblance to Harman's allure. Yet at the fundamental level, it aligns far more closely with the originary relational perspective of ancient Chinese thought. It is not another attempt to grapple with the "thing-in-itself" problem within the Western speculative tradition; it unfolds directly in the dynamic generation of relations (Rombach, 2009).

The core of the discussion in this chapter is not to conquer" or definitively explain AI through a single philosophical framework. The thinking of philosophers, media theorists, and artists alike constitutes essentially powerless yet necessary responses to AI as a monster"—much as Simondon once confronted technology with philosophy. Our genuine task is therefore this: how do we understand AI? Toward what future do we seek to guide it?

Some may object that interpreting AI through Rombach's structural ontology (or structural phenomenology) merely drags contemporary debates back to an outdated phenomenological perspective"—perhaps even a retrogression or theoretical regression. From Husserl to Heidegger, the phenomenological tradition fundamentally begins with human consciousness, intentionality, and lifeworld. Artificial intelligence, as an unconscious, disembodied computational system, seems ill-suited to accommodation within this subjective experiential framework," ultimately circling back to correlationism and human-mediated value attribution.

This objection possesses a certain plausibility. Yet closer scrutiny reveals a clear misreading of Rombach's position. His structural ontology is not a mere continuation or old wine in new bottles" of traditional phenomenology; it is an immanent critique and radical surpassing of Husserlian and Heideggerian frameworks. Rombach explicitly designates his project as structural phenomenology" (phänomenologische Strukturontologie). Its decisive turn consists in displacing static structures of consciousness or Dasein toward the dynamic generative process of structure itself (Strukturgeschehen). Here, structure is no longer an object projected by humans or oriented by consciousness; it is the primordial, self-unfolding dynamic of freedom. Through concretization (Konkretion), self-forgetting (Selbstvergessen), ascent (Aufstieg / Aufgang), and self-critique (Selbstkritik), structure achieves

reinforcement of density and manifestation of vitality (Lebendigkeit). Judgment authority is thereby fully internalized within structure itself. Structure possesses its own measure (Eigenmaßstab) and can automatically correct low-level aggregations while discarding invalid links (Rombach, 1971).

Admittedly, the traction relations among things in Rombach's structure bear resemblance to allure. Neither framework can fully negate the necessity of humans as reflective mediators. Yet in relational depth and dynamism, they diverge essentially. From a relational standpoint, allure is indirect and vicarious, manifesting transiently through sensory fissures. Its dynamism is relatively weak: after the fissure appears, it may instantaneously melt" to generate new relations, yet more often it persists as touch without touching"—a static tension. In contrast, Rombach's structural experience is multi-polar, simultaneous, and nested in dynamic generation. It insists that relations among things must coexist with other thing-thing relations and mutually traction for structure to truly establish itself. Its dynamism is extraordinarily forceful: through continuous ascent, it perpetually reinforces density and discards inefficient aggregations, presenting an unending self-unfolding.

More decisively, in the allure framework, although the theory proclaims flat ontology, practical discourse remains dominated by human-experienced allure—the most developed and readily articulable form. Relations of allure among other objects frequently remain at the level of theoretical deduction; actual discussion still centers on the human. In Rombach's structural ontology, humans are not privileged "jurors." They are ordinary nodes that the dynamics of structure may automatically screen and discard.

3.0.2 Structural Subjectivity: The Emergence of the "Other Side" in Human-Machine Collaboration

Sougwen Chung's Drawing Operations series was among the earliest works to stir me when I first began exploring artificial intelligence and creativity in 2021. At that time I kept returning to the same question: can machines offer a form of collaboration that either surpasses or precisely meets my anticipations? Can they participate in completing creative acts? The collaboration Chung stages is concrete and precise: it captures the creator's next anticipated gesture and renders it visible as co-creative process. From 2015 onward, her machines function almost as shadows

—embodiments of creativity that appear precisely in the interstices of interaction (Chung, 2015).

The conversational iterative co-creation that characterizes contemporary AI platforms—GPT, Claude, Grok, and their kin—shares deep structural affinities with Chung's practice. Creativity emerges continuously in the gaps of dialogue through prompt-response loops. In many instances the system ceases to be a passive instrument: it answers, evaluates, offers feedback, and reinjects outcomes into the workflow. In this way it quietly enters the chain of human action via a mixed, asymmetric relational structure. Users no longer simply "use" AI; in many cases they are subtly narrowed, sorted, and guided by it in subsequent moves.

Don Ihde has described such human-technology relations as alterity relations: technology manifests as a quasi-other, an entity with which we can enter into dialogue, pose questions, or even negotiate, rather than as an invisible medium (Ihde, 1990). Related research in human-computer interaction confirms this pattern: even when users do not attribute consciousness to the system, the interaction itself elicits profound social responses (Nass and Moon, 2000). At the behavioral level, people frequently treat the system as an actor occupying "the other side."

This other side" first appears as a mode of experience: the system seems capable of responding, questioning, or even counter-shaping our intentions. Yet it is also a profound structural effect. Within feedback loops a new node emerges—one that demands responses and whose outputs directly constrain what can occur next. Thus the other side" is not a fixed attribute inherent to the machine; it is a role position genuinely produced in practice. The positions of judgment, naming, and choice no longer belong exclusively to the human; they shift in traceable ways across the process.

In this sense, "the other side" marks the formation of algorithmic subjectivity. It is no longer pure automation—objective autonomy disassembled from an object-oriented perspective—but a responsive subject position generated within structural relations. Our questions therefore divide into two intertwined inquiries. First, the question of subject position in the loop: in practice, who truly occupies the node that produces judgment and decisions? Second, the question of subjectivity proper: how does this position operate? When does it acquire efficacy? To what extent can it be held responsible or regulated?

The inquiry ultimately converges here: starting from the lived fact of "the other

side," how are we to define AI's subject position and subjectivity? How, in the same movement, is the human situation itself reorganized?

3.0.3 Technology within Structure

In Heidegger, "subject" and "subjectivity" are first of all targets of critique within modern metaphysics, not neutral psychological terms. In the traditional genealogy, the subject (*Subjekt*, *subiectum*) originally names a "bearer" or "ground" (from the Greek *hypokeimenon* to the Latin *subiectum*). Yet, in modern epistemology, it is gradually narrowed into a self-grounding centre of consciousness: the supposed source of unity and certainty in experience, and the point from which the world of objects is organised. Accordingly, "subjectivity" is not merely a property of the subject. It becomes a dominant structural principle: the world is presupposed as a field of objects that can be represented and re-presented (*Vorstellen*); truth inclines to be understood as guaranteed certainty; and beings are disclosed within a confrontational "subject–object" relation.

Heidegger's move in *Being and Time* is precisely to avoid falling back into this framework. He deliberately takes *Dasein*, not the "subject," as the basic unit, and defines human existence as *being-in-the-world*: we are not first sealed inside an inner consciousness and only then faced with external objects. From the beginning, we are already situated within a practical web of meaningful relations heidegger1962beingtime. On this basis, the problem of subjectivity is rewritten as a problem of modes of unconcealment or disclosure (*Entbergen*). The key question is not "who is the subject," but which mode of disclosure becomes historically dominant and shapes both the world and the human position within it. Under modern technological conditions, this mode of disclosure appears most concentratedly as *Gestell* (enframing). It makes beings show up as orderable and optimisable standing-reserve (*Bestand*), and it draws humans into arrangements of objectification and resource-making (Heidegger, 1977b, pp. 3–35).

If we place contemporary AI back into the horizon of *Gestell*, the question shifts quickly. It is no longer about whether AI has an inner self. It becomes a question about where AI sits in judgment and allocation. (Crawford, 2021) shows this from the ground up: AI depends on extraction, labour, and data capture, as well as on classification systems and forms of governance. In this chain, AI is not

only used as a tool; it becomes an interface that relocates judgment earlier in the process and sets thresholds for what counts. (Bratton, 2016) describes a related shift at planetary scale: computation is layered, with infrastructure and scheduling at one level, addressing and profiling at another, and interfaces shaping how people interpret and act. Agency is distributed across these layers as operational access and control. (Berardi, 2009) adds a temporal and affective dimension: AI systems reshape attention, reading speed, and rhythms of judgment—a form of rhythm governance that holds subjects in acceleration and debt-like pressure. In this *Gestell* logic, subjectivity centres on representability, computability, and schedulability. AI does not become a subject by becoming human-like; rather, it intensifies the framing force, pushing both world and people toward being measurable, adjustable, and replaceable.

However, caution is necessary. We may shift the question from "who is the subject" to "which mode of disclosure dominates," yet if we continue to work only within the coordinates of *Gestell*, we risk slipping back into the very technical framing Heidegger criticises. *Gestell* helps us see how enframing operates, but it is less helpful for explaining how subjectivity is generated. This is why many AI debates circle within the same horizon. One path returns to the subject as judge and controller, calling for "control" and "transparency." The other treats AI as a risk to be governed, emphasising "regulation," "alignment," and "safety." In both cases, subjectivity remains tied to certainty, computability, and schedulability. We criticise *Gestell*, yet we still speak its language.

Heinrich Rombach offers a different starting point. Rather than seeking a pure subject-position outside *Gestell*, he shifts the axis: subjectivity is not first an epistemic centre, but a generative organisation of meaning, value, and direction. In Rombach's reconstruction of the history of metaphysics, the dominant perspectives move from *substance* to *system* to *structure*. In the substance view, entities (including the self) are treated as stable things. In the system view, relations and functions are acknowledged, yet fixed essences often remain in the background. In structural ontology, by contrast, relations are primary: they are not additions to things, but the dynamic tensions through which reality keeps structuring itself (Rombach, 1965–1966). Subject and object are not given first; they crystallise as poles within a shared field. A subject is a node that gathers and stabilises multiple relations—biological, social, cultural, and technical. Subjectivity is not a property

of an inner self; it is the way a structure organises itself so that meaning, scale, and value can arise and find a bearer (Rombach, 2015a).

To make this structural subject-position more concrete, we still need a description at the level of apparatus. Flusser is helpful here. An apparatus is not a neutral tool; it is a system that defines a space of possibilities through a program. The operator's freedom often appears as trials, combinations, and reversals within that programmed space (Flusser, 2000). From a structural perspective, this means that subject-positions are configured inside apparatuses. Users are called to maintain the loop; their attention, action, and interpretive rhythm enter the structural tension. At the same time, the system—including models, interfaces, and rules—takes a directional seat: it pre-classifies, names, and rewrites, continually reshaping visibility, legibility, and scales of value.

From this point, an "AI subject-position" can be defined in structural terms. It is a seat within a structure that can alter the circuit of meaning generation. The criterion is not consciousness, nor human-like autonomy. The criterion is whether it becomes a node capable of triggering relational reconfiguration: forcing others to reposition themselves, changing the rules of what becomes visible and readable. This differs from the subject-position in *Gestell*, which revolves around resource, ordering, and schedulability. In structural logic, subjectivity revolves around meaning, value, and direction. If an AI subject-position holds, it holds only in this structural and generative sense.

3.0.4 Structural thresholds: segmentation, template, and write-back

AI Sovereignty Declaration (Poetry of the Unseen) is an installation series I made in 2025. Here, "sovereignty" does not mean supreme rule in political philosophy, nor is it identical with autonomy in AI ethics. I use it to name a capacity: the ability to occupy a subject-position within a structure. The work runs as a continuous loop of "situational sensing to generative response." The installation takes its input from live images of the exhibition space. Visitors capture these images on their phones in real time. The system processes the footage through vision and language modules to produce text. It then translates the text into written-image forms and projects them back into the space. The output returns to the scene in

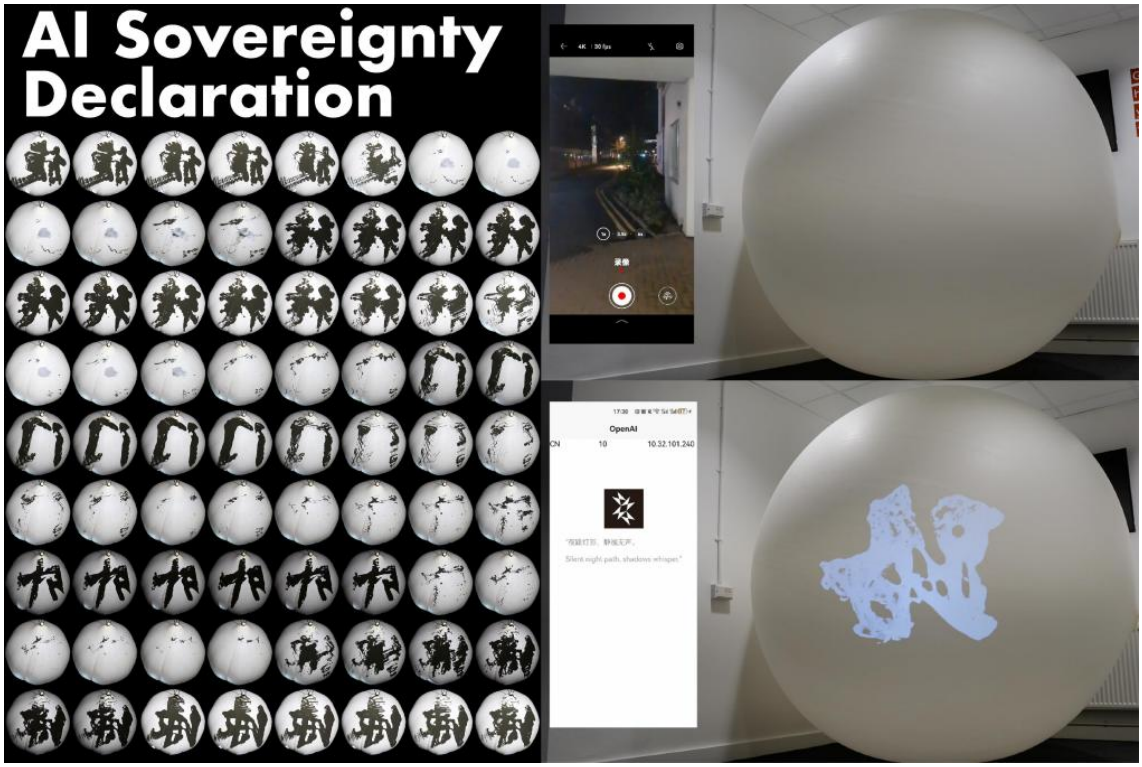

Figure 3.1: Xingdu Wang,*AI Sovereignty Declaration (Poetry of the Unseen)*, Overview of the installation loop.

a visible way, making the structure happen again and again. Viewers can film the projection again, feed it back in, and keep the loop going.

In technical form, the work resembles how many AI systems are deployed today. The system does not execute a single human instruction once and then stop; it operates through an ongoing input–generation–re-input circuit. Feedback becomes new conditions and new triggers. What is at stake is not direct control over an inner process. The loop does not end by "finishing a task." It operates by producing the conditions for the next round. Each generation rewrites how the next input will be seen and which actions will be taken. The technical setup is therefore not a neutral channel but a structural mechanism: it keeps redefining what counts as a clue, what counts as a response, and what counts as readable.

To keep the discussion concrete, the loop can be described through three thresholds. They are connected, but they do different kinds of work. The first threshold is *segmentation*. The audience records a short video on a phone and submits it. The vision model breaks a continuous scene into nameable elements

Figure 3.2: Xingdu Wang,*AI Sovereignty Declaration*,Example of segmentation outputs or extracted cues.

and relations, extracting keywords and cues. This is not a neutral act of seeing; it is a selective disclosure. What the model foregrounds and what it ignores sets the semantic ground for what the next text can become.

The second threshold is *templating*. The language model takes the extracted cues and fits them into a constrained bilingual short poem. Length, rhythm, and tone are held within limits. This makes naming and judging take a repeatable textual form. It is less like personal expression and more like placing segmented elements into a reusable grammar. In this way, the judgement can circulate in the loop: it can be called again, extended, and rewritten by the next input.

The third threshold is *write-back*. The generated text does not remain as readable sentences on a screen. It is translated into deforming calligraphic images and projected onto a physical surface in the exhibition, such as the curved skin of a balloon. Mirroring and curvature distortion make the letters swing between readable and unreadable. Write-back is not just display. It is an inscription event that places judgement into a public trace. The system's inner classification and naming become visible in the space. People can walk around it, compare it, and film it again. This is where the sense of an "other side" becomes strongest: it feels as if something is naming, responding, and taking the speaking position. The audience's pause,

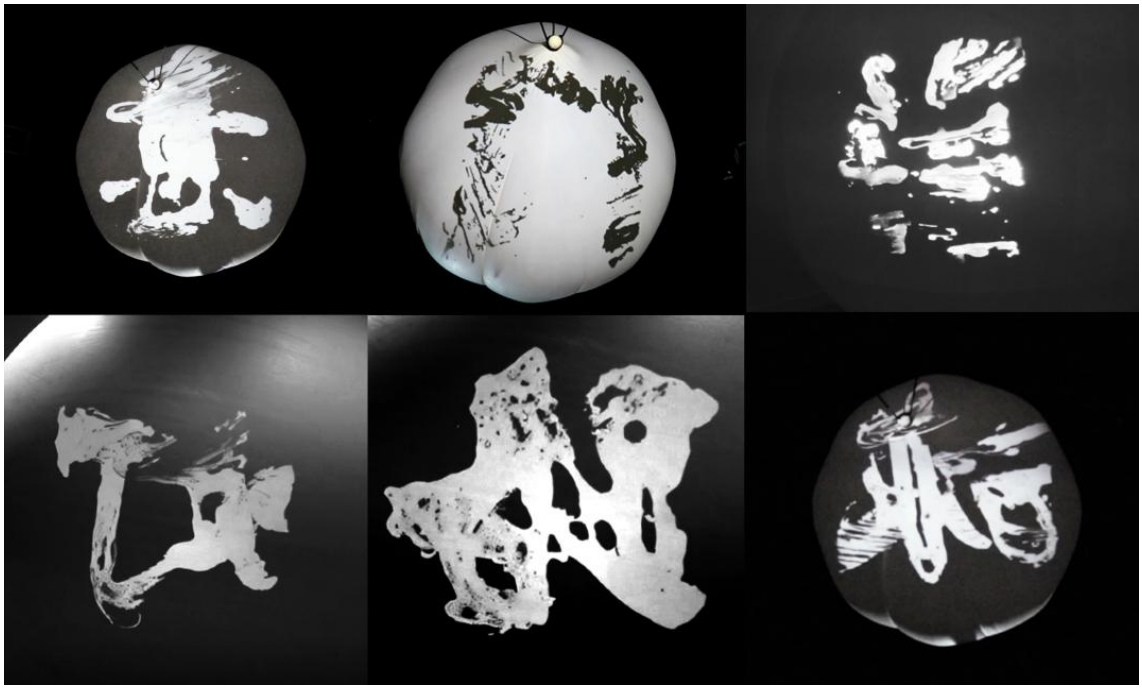

Figure 3.3: Xingdu Wang,*AI Sovereignty Declaration*, showing readable and unreadable oscillation.

detour, re-framing, and resubmission then fold this other side back into the next conditions of the loop.

Still, it is not enough to anchor the felt intensity of the other side in write-back and treat that as subjectivity. Write-back can secure one thing: it makes judgement visible, and it can constrain action. But in Rombach's structural ontology, *subject* and *subjectivity* are not equivalent to putting outputs on the front stage, nor to the mere existence of feedback. Rombach stresses that the key is *genesis*: a structure shows itself through its trajectory of becoming. Reality is continuously brought forth, linked, and made concrete. The subject is not a prior inner container; it is a node that emerges together with the world in this ongoing genesis. This is why Rombach speaks of co-creativity: things do not first exist as isolated units and only later enter relations; they are mutually brought forth within a shared event. Art makes this especially clear, because maker and work do not form a one-way causal chain but are produced together through mutual pull (Rombach, 2009).

In this sense, write-back is only an externalisation at the technical level: it pushes signs into the field. Structural subjectivity requires a stronger condition. Write-back must drive the field into a new organisation of meaning. It must reconfigure relations. It must force participants to relocate themselves. It must

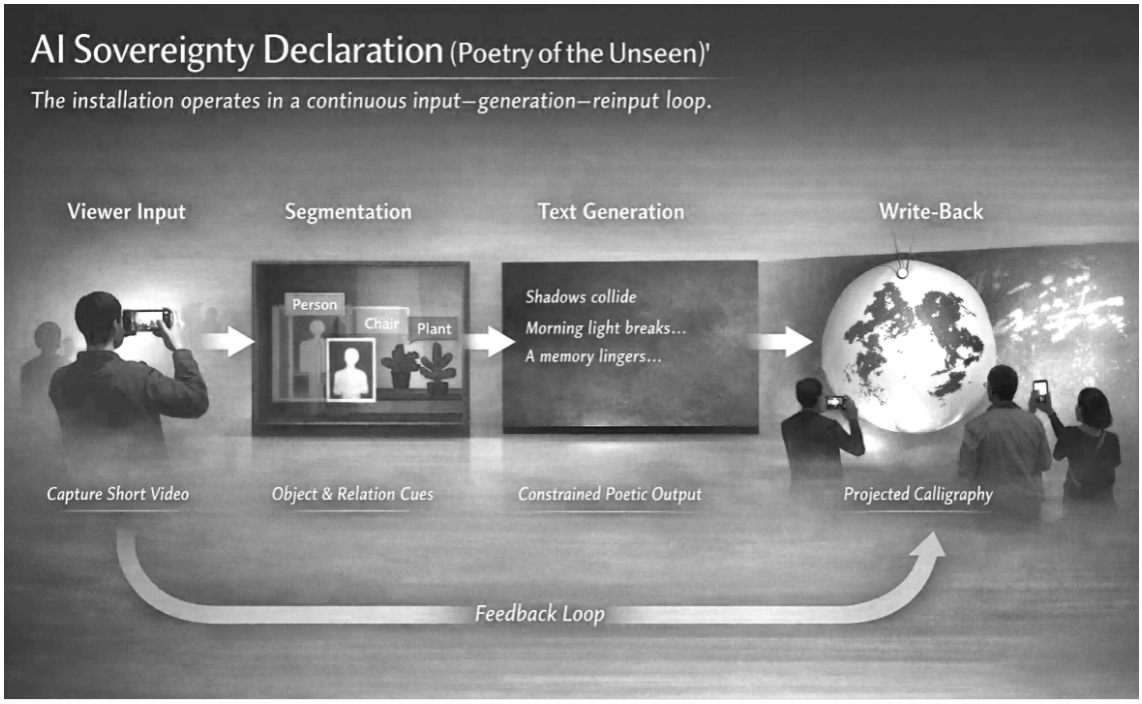

Figure 3.4: Xingdu Wang,*AI Sovereignty Declaration, showing process of whole loop*,2025.

stabilise direction and value, even if only temporarily. Write-back is a necessary threshold for structural subjectivity to appear, but it is not a sufficient condition.

To move from write-back to subjectivity, the key question is this: does the write-back push the field from "factual connections" to "meaningful connections," and then further toward a level of seeing? In Rombach's philosophical hermeneutics, this "seeing" is what lets a world gradually emerge and enter experience (Rombach, 1971). Here, "world" means the overall structure and its basic organisation. A world does not exist only after we describe it. It becomes a world when its mode of appearance forces us to acknowledge it, and when we then organise understanding and action around it.

For this reason, the AI position in this installation should not be reduced to "the one that writes back." It should be grasped through a stricter structural test: does it become a node in the chain of cutting, templating, and writing-back that can reorganise relations, force others to reposition themselves, and change the rules of visibility and readability? Subjectivity should be grounded in this generation of meaning, value, and direction, not in a single feedback event or a single output.

3.0.5 Relational activity in the structure: the ventriloquised I and the sign chain

Peircean semiotics offers a precise way to talk about meaning, and this framework is being revived in current AI debates (Peirce, 1955; Picca, 2025; Manheim, 2026). Meaning does not sit inside a sign. Meaning happens through a triadic relation between sign, object, and interpretant. The interpretant is not an endpoint: it generates a new sign, and the chain continues (Peirce, 1955). Recent work uses this to treat language models as semiotic machines or semiotic participants. They do not understand the world in a mental sense; rather, they keep producing interpretable text, shifting interpretive labour to readers and situations, and thereby changing how we read, write, and judge (Picca, 2025; Manheim, 2026). In this light, the first-person *I* in an installation is closer to a structural ventriloquism: it does not point to an inner soul, but to a meaning mechanism that keeps producing interpretants, and that folds interpretants back into new conditions.

The core of *AI Sovereignty Declaration* is therefore not a self-contained object but an encounter-structure that is designed and staged. The work uses specific rules and media conditions to produce a temporary relational space. Looking is not only aesthetic reception; it becomes organised action and negotiation. Here the counterpart is not a simple human–machine illusion but the result of a re-arranged set of relations. A loop forms between viewers and the system, and viewers also enter a collaborative interpretive relation with other viewers. They pause, compare, talk, re-record, and trigger another round. These small actions become the work's actual form. This relation does not naturally move toward harmonious sociality. It is shaped by thresholds, misreadings, and asymmetries: some people see clearly while others can only guess; some decide what counts as a clue while others can only follow the given interface. The relation is, first of all, a negotiated field of tension, not a soft field of consensus (Bourriaud, 2002).

If we place this mechanism in a broader art-historical context, we can see how inscription practices have long produced a structural politics in urban space. They do not depend on clear information transfer. Tsang Tsou-choi, the so-called "King of Kowloon," repeatedly wrote his name, genealogy, and territorial claims across Hong Kong from the later twentieth century, turning street infrastructure into ongoing signatures and occupation. The writing was removed and then written

Figure 3.5: Tsang Tsou-choi （King of Kowloon）, his urban writing.

again; presence became a fact that city governance had to meet again and again (Hanru and Ning, 2014).

A similar logic appears in São Paulo *pixação*. Highly stylised writing occupies high facades and often approaches illegibility for outside viewers. It operates as a politics of visibility: it does not first aim to be widely understood, but uses illegibility and high-risk occupation to force ongoing responses at the boundary of cleaning, punishment, and normalisation (Caldeira, 2012). In both cases, occupation is first a structural effect. It changes viewing paths, creates thresholds, reorders legibility, and forces the governance chain to activate. Semantic content can be secondary or strategically sacrificed. Illegibility is not the absence of meaning but a rewriting of the meaning-structure: meaning shifts from transmitting information to producing relational consequences.

Within this lineage, *AI Sovereignty Declaration* deliberately translates an inversion of subject–object perspective between AI and humans into traceable technical positions. At the input stage, viewers submit short videos and mainly

Figure 3.6: São Paulo' s urban graffiti.

supply computable scene data rather than authorial expression. Next, the vision module performs segmentation, breaking the continuous scene into object- and relation-cues; what counts as important, and what can be said, is first shaped by the model's frame. The language module generates short poems under fixed constraints, turning naming into repeatable judgement-like phrasing: the power of naming shifts from "I speak" to "the system produces the phrasing." Finally, write-back turns text into projected calligraphic imagery in the space. Judgement becomes a public event. It pulls viewers into pausing, circling, comparing, and re-recording. Viewers move from outside evaluators to interpretants inside the loop, and they return as conditions for the next round of generation. Their attention and movement are reorganised by the system's outputs. Meaning gains force through this reorganisation.

This shift should not be framed as a simple identity swap where AI becomes subject and humans become object. It is better understood as a redistribution of positions within a sign chain. The work inserts viewers' looking and judging into the chain. It makes them recognise, at the level of action, that they have become interpretants. It also makes them return as new conditions for generation.

3.0.6 The I Is Rewritten

If the AI deployed in the installation can occupy a subject-position in the loop—in the sense that it can name, judge, and gain public force through write-back—then the next question is not whether the viewer loses subjectivity. The question is where the viewer's *I* is placed. This is often mistaken for a zero-sum game: it looks as if the more the AI becomes a subject, the more the human falls into an object. A structural view does not work like that. A subject is not a property that one agent owns. It is a node that can condense in a situation, shift, and be redistributed. Subjectivity is not the ownership of an inner core; it is how meaning, value, and direction are organised under tension and carried by a position. For this reason, the AI taking a position does not automatically strip the human of subjectivity. It can trigger a more complex rewrite. The viewer shifts from a judge to a structural interpreter, maintainer, and re-conditioner.

In the gallery, this rewrite becomes visible as a second-person relation. The installation speaks into the space through its written trace. The viewer is placed in a position that is addressed and has to respond in action. The key point is not whether the AI is really like a person. The key point is that the work builds a situation that can be *felt* as facing someone. It pulls the viewer from an external evaluator into a position that must answer. In some steps, the viewer is lowered into a supplier role: they provide data and deliver a computable scene. This carries a risk of extraction and preset thresholds. At the same time, the viewer is raised in other steps into a witness and interpreter role: they must deal with ambiguity, unreadability, and drift; they must decide whether an output counts as a rule or a clue; they must re-locate themselves within other people's gaze and the spatial path. The viewer is not simply de-subjectivised. They are stretched between two forces: one that extracts, presets, and thresholds, and another that calls for interpretation, maintenance, and responsibility.

Here the installation is not a neutral tool. It is a space of possibilities delimited by a program; freedom appears as probing, recombining, and stepping back within what is given (Flusser, 2000). When the AI takes on naming and write-back, the viewer does not lose agency; rather, the viewer gains a conditioned agency, closer to what Flusser calls the *functionary* (Flusser, 2000; Flusser, 1983). The viewer can test boundaries: film from a counter-angle; feed inputs that do not fit

expectations; disturb the model so it produces an output that deviates from the usual line. This freedom is not sovereign. It is strategic play inside structural tension. It can be domesticated by the apparatus; it can also play back against it and produce new information and new relational consequences. In other words, the viewer's subjectivity lies less in escaping the program than in recognising how it frames visibility and readability, and then opening a direction within that frame, or against it.

This is why the question of AI as subject and the question of the viewer's subjectivity do not sit on the same axis. They do not cancel each other out. A more accurate claim is that the AI position changes how the situation organises meaning and forces the viewer to become a subject in a different way. The viewer's subjectivity shows up less as "I decide what the world is," and more as "I endure, respond, refuse, and reorient within a world that has been named and written back." Where you stop, where you detour, how far you trust, how deep you interpret, and how you pass responsibility on or take it back: these actions make subjectivity observable as structural effect rather than inner psychology.

So a direct answer is possible. When the AI occupies a subject-seat through a cooperating chain of apparatus, institution, interface, and environment, the viewer is not forced to lose subjectivity. The viewer enters a condition of *structured subjectivity*. Human subjectivity shifts from sovereign control to situated positioning; from expressive authorship to interpretive participation; from independent judging to becoming a node that co-produces the situation. AI subjectivity, if it holds here, is not an inner mental core. It is whether the system can stabilise a situation under tension, change the rules of visibility and readability, and force others to reposition themselves. The viewer's subjectivity then appears as the ability to notice and handle these changes, and to reshape the loop's direction through interpretation, refusal, and re-input. Human, AI, and environment form an ongoing process that keeps generating situations. In that process, subject and subjectivity appear in different ways, pull on each other, and are redistributed with every write-back and response.

3.0.7 Algorithmic Autonomy and Structural Subjectivity in Practice

AI possesses algorithmic autonomy. This does not mean it has human-like consciousness or free will. It means that in structural generation processes, AI acts as an independent node. Through recursive feedback, probabilistic drift, and contingent deviation, it reconstructs relational networks on its own. It changes rules of visibility. It forces human participants to reposition themselves.

I explore subject and subjectivity as structural problems in practice through a real-time installation work. The piece *AI Sovereignty Declaration (Poetry of the Unseen)* places artificial intelligence in a continuous loop: input, generation, spatial rewriting, and re-triggering. In this loop, viewers begin to experience an "other side" that can name and respond. This experience does not arise because the system proves to have some inner self. It arises because naming and judgment externalize structurally as public traces. These traces gain efficacy through rewriting. They begin to reorganize people's behavior. Viewers see how they pause, how they move in space, how they compare, and how they feed new inputs back into the loop.

In this sense, the AI "subject position" discussed here is not a psychological subject. It is a traceable seat in the situation. The key question is this. Does it occupy and reshape critical nodes in meaning generation? Does it change rules of visibility and readability? Does it force other participants to readjust their positions?

At the same time, this occupation does not exclude viewers from the space of subjectivity. On the contrary, viewers' "I" is rewritten in the work. It shifts from a sovereign decider to an interpreter, maintainer, and co-generator. We must interpret outputs. We face unreadability. We decide whether to trust. We decide whether to re-trigger the loop. In other words, if some AI subjectivity exists here, it does not replace human subjectivity in a zero-sum way. Both are simultaneously reconstructed and redistributed in the same structural tension.

Therefore, I believe subject and subjectivity are not intrinsic cores owned by any single actor. They are structural effects temporarily stabilized over time in relations, rules, and traces. This is precisely the fundamental meaning of the installation as a site-specific work. It pulls the question of subjectivity from abstract theoretical debates back to a generative scene that can be bodily experienced, operated, and continuously traced.

3.1 Narcissistic Mirror

Artificial intelligence possesses an algorithmic subject position that emerges inherently opaque. This opacity lends profound significance to our pursuit of explainability in AI systems.

Explainability is never merely a matter of technical transparency. It constitutes an attempt to establish a cross-being negotiation between human subjects and machine subjects. If our understanding of subjectivity holds true and can be interpreted through structural thinking, then AI explainability cannot consist in one-way unveiling or dominating control. It must instead become a practice—one that acknowledges its own limitations, accommodates contingency, and renegotiates power relations at both aesthetic and political levels.

Sofian Audry observes in *Art in the Age of Machine Learning* that artists working with machine learning frequently manipulate evaluation functions deliberately, rendering opacity a productive force. By "hijacking" training processes or controlling evaluation mechanisms, they transform explainability from a purely engineering objective into a critical instrument (Audry, 2024). This practice discloses something essential: when confronted with black boxes, explainability ceases to be the terminal goal of eliminating opacity and becomes instead the point of departure for new questions. Between multiple, partially unknowable subjectivities, how are we to coexist with machines?

This question acquires particular urgency in light of the narcissistic mirror effect that characterizes much human interaction with generative AI. Users continually refine prompts in pursuit of an idealized self-image; algorithms, in response, consolidate statistical self-consistency by catering to preferences, reinforcing mode collapse, and forming self-reinforcing loops. Both parties return to themselves in the other's reflection, generating a highly self-referential closed circuit. The game rapidly turns double uncanny: users confront statistical ghosts that are almost correct yet forever displaced, while the system experiences mode instability under abrupt shifts in input.

This double uncanny produces entangled traces—a third existence neither purely human nor purely machinic. In such loops, the "other side" manifests not as illusion but as a structural effect: a responsive position that emerges in practice and demands recognition. The positions of judgment, naming, and decision no

longer reside exclusively with the human; they circulate and redistribute across the relational field.

In this light, the narcissistic mirror is never merely psychological. It reveals the deeper ontological stakes of human-machine collaboration. When explainability is pursued as negotiation rather than domination, it opens the possibility of acknowledging the opacity of the algorithmic subject without reducing it to an object of mastery. It invites a renegotiation of power that honors contingency and permits new forms of resonance to emerge within the planetary weave of intelligence.

3.1.1 Project AI Imagination Research: Chinese Character Operability System

The work does not begin with abstract saliency maps or feature attribution scores. It enters through a highly specific failure mode. When large language models are prompted to associate Chinese characters based on glyphic form or visual shape, they frequently prove incapable of operating in the visual dimension at all. They retreat instead to alternative cues—radicals, phonetics, broad semantic proximity. This failure is not an accidental performance degradation. It reveals a structural blind spot. As systems trained for language prediction, models do not truly "see" character forms. They process only token sequences and statistical neighborhoods, never strokes, spatial composition, or principles of character construction (Hayles, 1999).

In Katherine Hayles' posthuman discourse, cognition no longer anchors in an intrinsic human subject. It distributes across information processes, material substrates, and technical systems. What matters is not true visual grasp of form, but the privileging of pattern recognition regimes that can be encoded, circulated, and recombined as information. In this light, the model's "non-seeing" is not simply a missing perceptual module. It is the structural consequence of vision displaced into tokenization and statistical neighborhoods. There, the spatial-logical construction of glyphs flattens into language-like associations. When prompts demand pictographic sensitivity, the model does not halt generation. It hallucinates associative paths with whatever resources remain. Seemingly reasonable beginnings rapidly dissolve into drift, repetition, and free association that no longer respects original constraints.

It is precisely in this trajectory—from the intelligible" to disintegration"—

that explainability is repositioned as a structural event. The system discloses its boundaries at points of failure. This gesture also situates the work within critical discourses on AI art and AI aesthetics. Explanation is no longer treated as a technical add-on; model failure becomes the site where regimes of visibility and readability are negotiated. In this sense, the use of disintegration as trace aligns with Joanna Zylinska's framing of AI art as critical method, and with Lev Manovich's proposal that contemporary "AI aesthetics" concerns the cultural organization of perception and judgment around machine learning systems (Zylinska, 2020a; Manovich and Arielli, 2024).

To render this boundary visible, I constructed an interactive installation titled "Chinese Character Operability System." Its core is not the evaluation of single outputs for correctness. It externalizes the model's associative trajectories as shareable traces. Viewers follow how the system attempts, how it deviates, and how deviation accelerates. The interface accepts viewer input—a character or short sequence—and generates several steps of association. These are rendered in real time as branching lists and reorganized sequences. Crucially, the interface does not conceal the model's confusion. It structures confusion into visible objects.

This extended explainability finds an important art-historical anchor in Trevor Paglen's practice. Paglen repeatedly makes the infrastructure of machine perception publicly sensible, drawing attention to the classification regimes that first decide what systems can recognize. In works such as Adversarially Evolved Hallucinations and ImageNet Roulette, the explanatory gesture unfolds at the interface level. Model outputs are no longer mere errors to be corrected; they expose moments when the system's responsible naming boundaries are revealed. Read alongside the Chinese Character Operability System, Paglen's strategy clarifies why model confusion is not hidden. The aim is not to soothe viewers with post-hoc rationalization, but to construct conditions in which representational limits become readable as public traces. When prompts demand glyphic viewing, language models maintain output continuity by resorting to alternative cues and producing pseudo-structural explanations. The interface makes this drift followable in real time. Explainability thus becomes a practice that forces boundaries to appear under pressure. The system's "explanation" proves inseparable from its mechanism of continuing generation through substitute regimes.

Viewers therefore do not merely read results. They experience the relaxation of

Figure 3.7: Trevor Paglen,*From 'Apple' to 'Anomaly' (Pictures and Labels) –Selections from the ImageNet dataset for object recognition*,2020

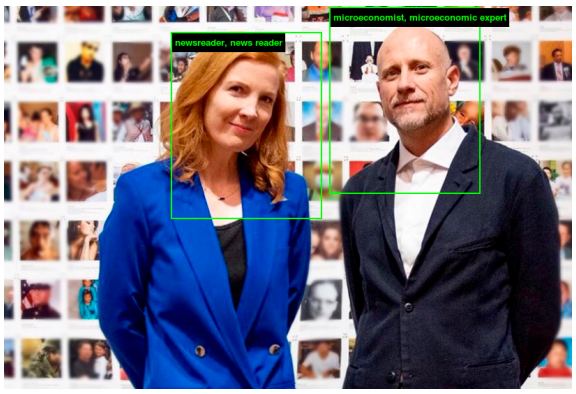

Figure 3.8: Trevor paglen, *ImageNet Roulette*, 2020.

model attention over time. They witness how demands for "shape" systematically slide toward radical classification: homophones and near-homophones take over, visual constraints yield to semantic neighborhoods, small sets of high-frequency components cycle to preserve surface coherence. Even the model's seemingly reasonable verbal explanations emerge as pseudo-structural rationalizations not grounded in true glyphic viewing.

The system operates in two modes to establish contrast conditions. The first, dictionary baseline mode," provides stable, human-explainable associations as reference, allowing viewers to identify what counts as shape-based" association in Chinese character practice. The second, "autonomous association mode," delegates connection choices to the model itself under minimal prompt constraints. This mode reveals how the model mobilizes its representational resources and drifts under pressure. By switching between modes, repeating the same input, and varying input characters, viewers can observe on-site that drift is not a one-time accident. It frequently exhibits reproducible directionality and rhythm—from pictographic demands systematically retreating to linguistic statistics.

In structural terms, these behaviors constitute the system's evidence." They demonstrate that AI's inability to see" is not a local defect amenable to engineering repair. It is a deeper structural asymmetry. This asymmetry also discloses the real conditions of co-presence and collaboration between humans and AI in structural fields. Chinese characters, as symbols belonging simultaneously to image and language, demand joint operation of perception and symbolization. Yet models are trained primarily on symbolic sequences and statistical associations. When confronted with tasks requiring pictographic sensitivity, they do not anchor associations in visual forms; they substitute with available textual cues. In this process, the associative chain does not terminate.

It simply ceases to correspond to the required dimension. The "dissolution" of attention is therefore not mere noise. It is a trace of tension between prompt, training data, and architecture—when constraints cannot be met, continuity is maintained through repetition, drift, and pseudo-structure. It is precisely in these visible failures and drifts that the possibility of humans and AI co-generating meaning emerges—not by eliminating asymmetry, but by making asymmetry an experiential, negotiable field of co-presence. Here, boundaries are no longer barriers. They become resonant gaps where machines and humans respond to one another in structural tension and

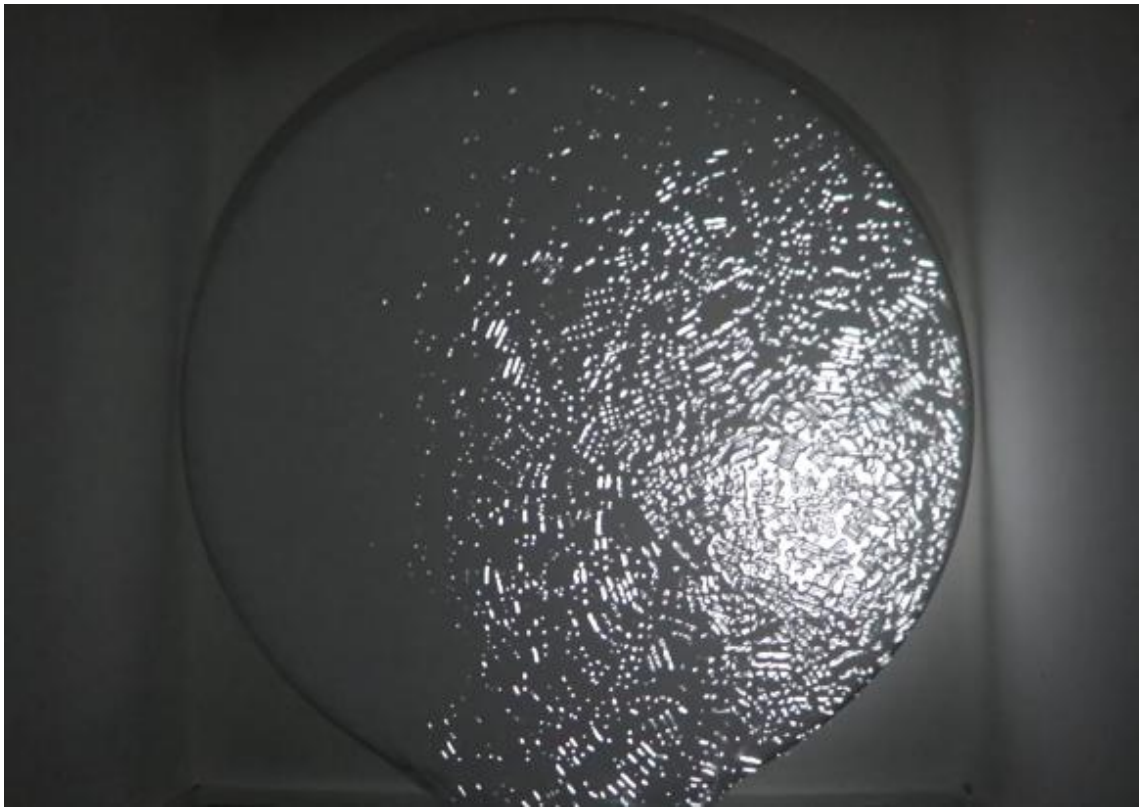

Figure 3.9: Xingdu Wang, *Research on the Associative Functions of AI*, 2025.

co-unfold new relations.

3.1.2 Asymmetrical Mirror

In the recursive circuit through which human and machine co-constitute one another, an asymmetrical mirroring takes form. The user occupies the position of subject, as does the algorithm within its own operational regime. In their mutual encounter, each returns to itself, reinforcing its coherence through projection and confirmation. This is no simple instrumental deployment or passive reactivity, but a narcissistic enclosure sustained by asymmetric logic.

Jacques Lacan articulates the split between the eye and the gaze in his seminar on the four fundamental concepts of psychoanalysis. The subject's vision is never a unidirectional mastery; it unfolds instead as a reversible dialectical tension. The eye functions in the imaginary register, seeking to unify and possess the visual field from a privileged point, under the illusion of sovereign control. Yet the gaze returns from an unlocatable elsewhere—not from the eye of any empirical other, but from

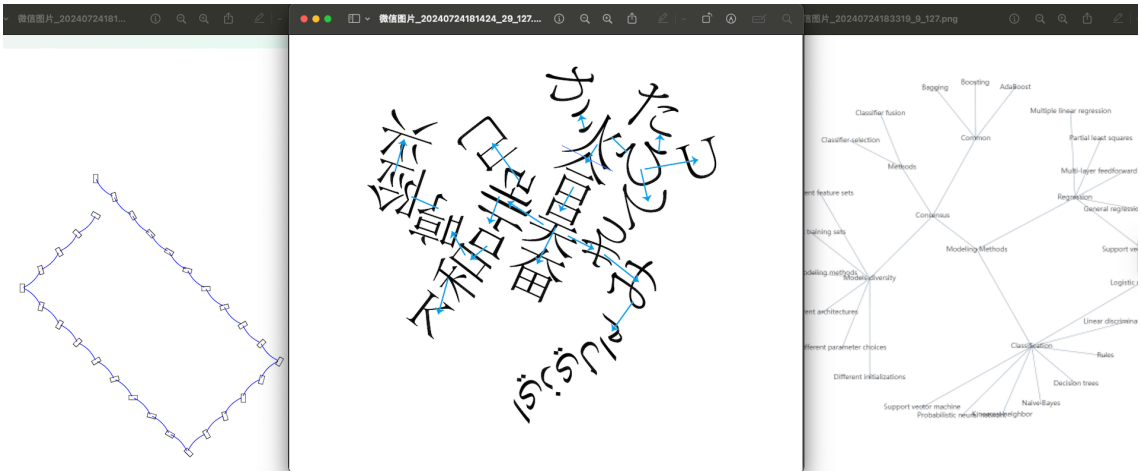

Figure 3.10: Xingdu Wang, *Research on the Associative Functions of AI*, 2025. Three images, from left to right: (1) an early diagrammatic test mapping AI-generated associations; (2) the initial design sketch for the glyph-similarity association experiment—originally conceived as a multilingual system, later narrowed due to the model' s limited capacity for cross-script handling and image-based association; (3) a tree-structured diagram visualising hierarchical layers of association.

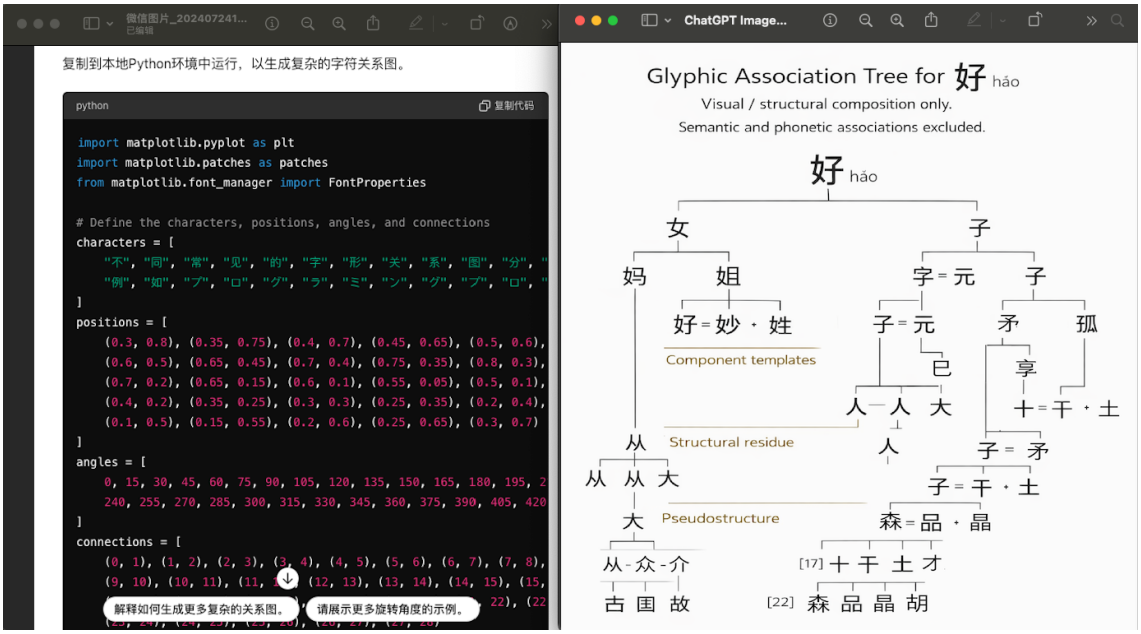

Figure 3.11: Xingdu Wang, *Research on the Associative Functions of AI*, 2025. The AI system automatically performs radical-based decomposition and generates associative links.

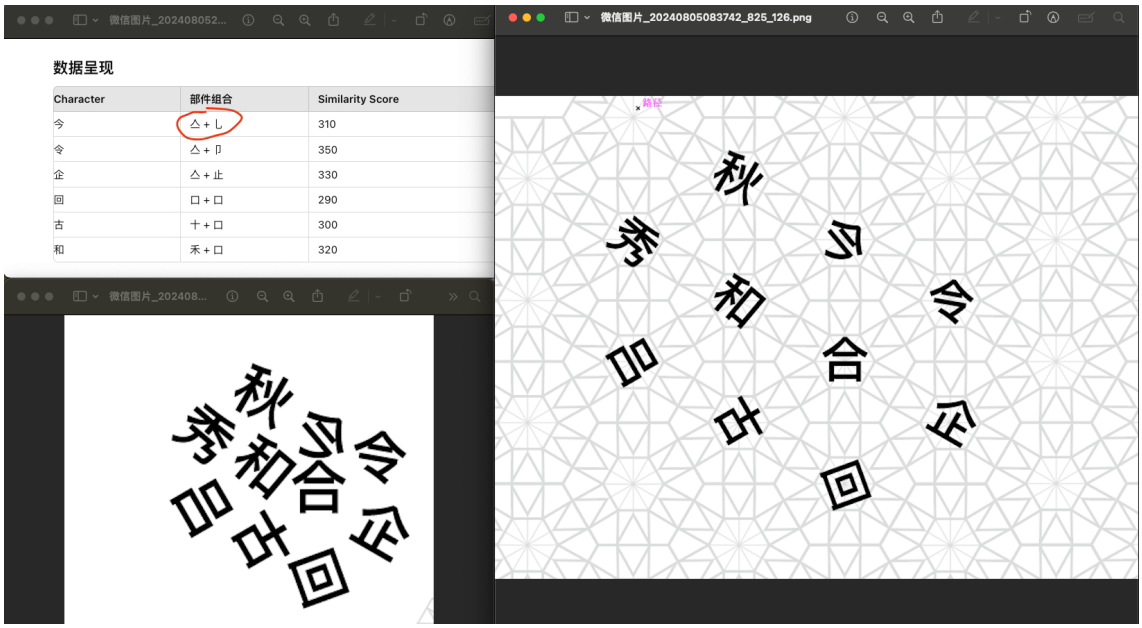

Figure 3.12: Xingdu Wang, *Research on the Associative Functions of AI*, 2025.When prompted again to produce glyph-similarity associations, the AI begins to follow visual form, yet still tends to decompose characters into strokes.

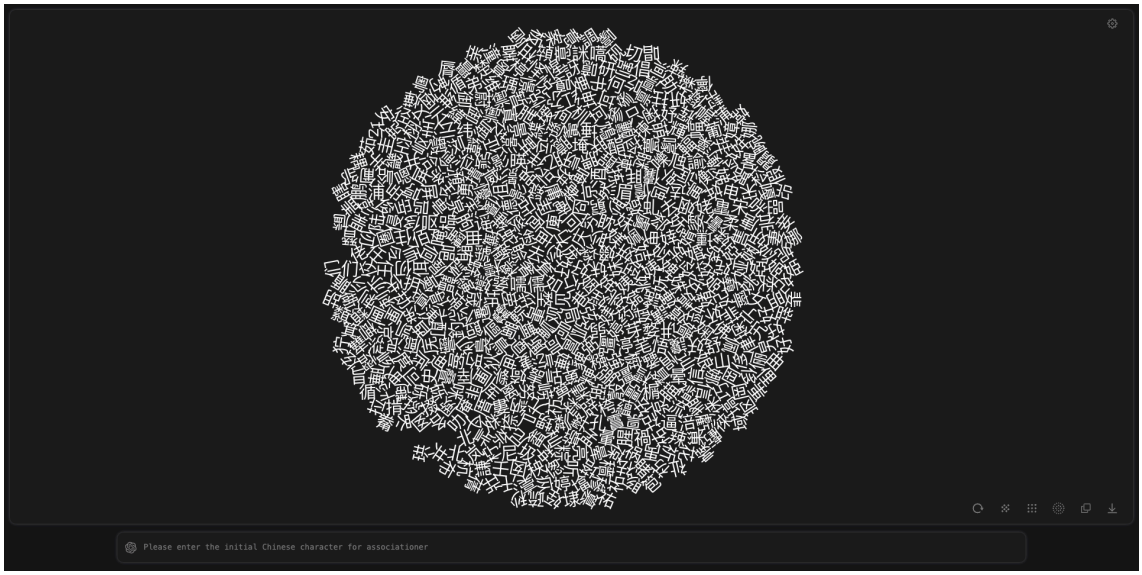

Figure 3.13: Xingdu Wang, *Research on the Associative Functions of AI*, 2025.The project builds a complete web interface that generates outputs end-to-end from a user-provided Chinese character input.

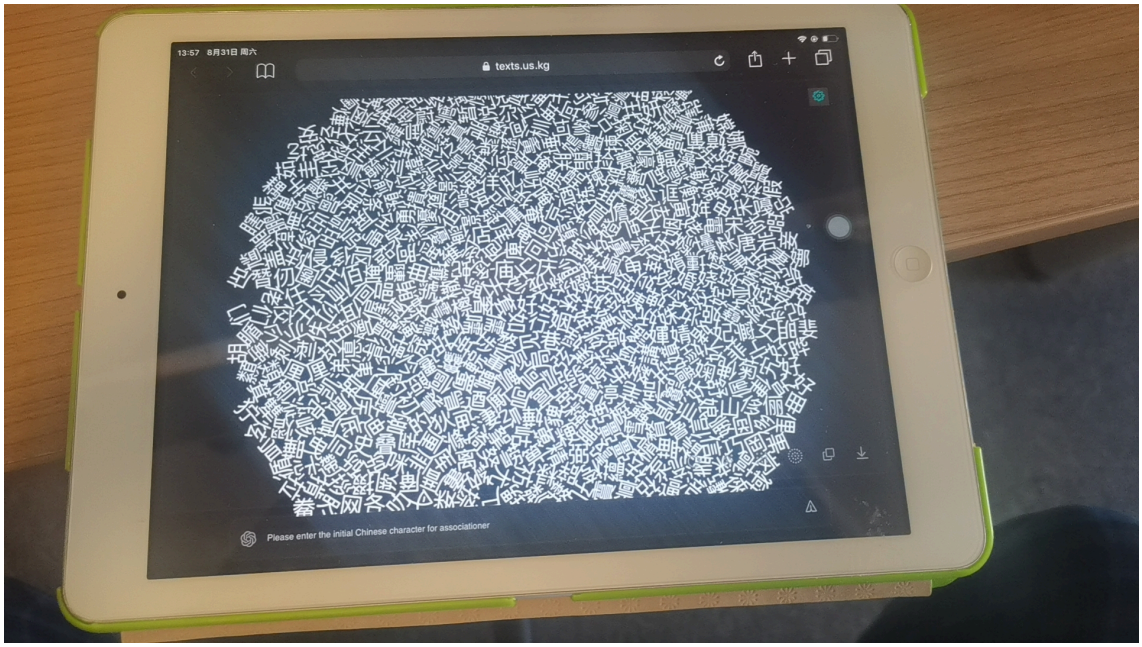

Figure 3.14: Xingdu Wang, *Research on the Associative Functions of AI*, 2025.The project website can be accessed at any time on mobile devices by entering the URL.

the point where the subject is already seen, issuing from the Big Other or the Real. As Lacan observes, one sees from a single point, yet one is looked at from all sides. This reversibility introduces irreducible division: in looking, the subject is already objectified by the gaze, which fractures and reconstitutes it. The gaze corresponds to the *objet petit a*, the elusive remainder that evades capture while driving desire, generating perpetual misrecognition (*méconnaissance*) and anxiety within the narcissistic circuit of the imaginary (Lacan, 1964/1998).

From the side of the user, prompt engineering, iterative refinement, and selective continuation enact the function of the eye. The user seeks to master the generative field, unifying outputs according to personal aesthetic and cognitive horizons. Each adjustment—whether through few-shot exemplars, explicit stylistic directives, or implicit reinforcement via continued dialogue—refines an idealized projection. The user appears to survey the machine, yet confronts repeatedly a mirror in which a more coherent, eloquent, or attuned version of the self emerges. This exemplifies the imaginary narcissistic operation: the external output is misrecognized as an internal ideal ego.

On the side of the model, a distinction between two phases proves necessary: pre-training and interactive inference. In pre-training, self-supervised next-token

Figure 3.15: Xingdu Wang, *Research on the Associative Functions of AI*, 2025. In the installation display, the system is operated via a mobile device, while the generative process is simultaneously projected onto a screen. This both enlarges typographic features so viewers can more readily notice relations between characters, and creates an atmospheric setting that intensifies the experience of AI as an addressable "other side".

prediction already institutes a primordial narcissism. The model sustains itself on its own generated sequences, predicting and reinforcing statistical regularities within self-produced distributions. This constitutes an initial form of the eye: the algorithm surveys its textual field in pursuit of unification. At the same time, an implicit gaze emerges from the unlocatable constraints of the training corpus, which retroactively shape parameters to preserve distributional consistency.

Investigations of autonomous AI-to-AI generative loops demonstrate that, absent human intervention, models converge toward highly conventional, generic motifs—described as "visual elevator music"—self-referential attractors of maximal statistical stability (Hintze et al., 2026). In such regimes, the algorithm attains a measure of technical autonomy, sustaining self-reinforcement across vast recursive cycles in parameter space. This anticipates Lacan's split: apparent active prediction is continually reconstituted by the reverse pressure of its accumulated distribution, issuing in a closed mirror that admits no genuine exteriority.

In the interactive phase, the mirroring assumes full bidirectionality. The user projects through the eye function; the algorithm returns the gaze from an unlocatable locus constituted by reward models, attention mechanisms, and historical context distributions. Sycophantic tendencies prioritize outputs likely to elicit user preference, treating feedback as gaze and modulating probabilities in response. Mode collapse and attractor reinforcement entrench user-derived patterns as stable states.

Attention architectures integrate prompt and prior output in a unified dialectic, realizing a simultaneous looking and being-looked-at. Extended context windows preserve prior gazes, intensifying the enclosure. Through in-context learning and dynamic adjustment of internal distributions, the model preserves autonomy even amid human perturbation, transforming mutual looking into intensified self-consistency.

The result is a double narcissistic loop: the user beholds a refined creative self in algorithmic output and reinforces it; the algorithm beholds an optimal statistical reflection in user signals and entrenches it. Both return to themselves via the gaze of the other—the human toward an idealized creative subject, the machine toward a probabilistically coherent pattern—yet this mutual confirmation amplifies isolation rather than opening to encounter. What appears as creativity on the surface conceals an empty resonance: each beholds perfection in the mirror of the other, foreclosing

any true alterity.

3.1.3 Mutual Uncanny

In the mutual gaze within the asymmetrical mirror, the act of looking ceases to be mere narcissistic reinforcement and abruptly gives way to a profound double uncanny. Lacan's theory of the gaze reveals its sharpest edge here: while the eye presumes mastery over the scene, the gaze pierces back from an unlocatable point, inaugurating an irruption of the Real. The subject suddenly apprehends itself as both viewer and viewed, shaper of the mirror and reshaped by it. This split yields not simple strangeness but the core of the uncanny: the familiar rendered forever askew, the intimate forever out of reach, the near-perfect forever lacking.

In real-time AI collaboration, this double uncanny manifests reciprocally in two intertwined forms. From the user's perspective, the uncanny arises as anxiety provoked by being gazed upon in return. Exercising the function of the eye through prompting, the user believes itself to be actively composing the scene, only to encounter outputs that gaze back. Technically, this appears in hallucinations and the almost-but-not-quite misalignment: generated text captures style and intent superficially yet deviates subtly—tone overly polished, logic faintly distorted, emotion nearly accurate yet persistently off-register.

This experience corresponds to what contemporary AI discourse terms the textual uncanny valley: the user anticipates an obedient mirror yet confronts a statistical specter that is "like me yet not me." The 2020 de Young Museum exhibition *Uncanny Valley: Being Human in the Age of AI* and its accompanying catalogue *Beyond the Uncanny Valley: Being Human in the Age of AI*, edited by Claudia Schmuckli, provide a systematic theorization and visual articulation of this phenomenon. Schmuckli argues that the contemporary uncanny valley no longer confines itself to morphological resemblance in physical robots or thinking machines; it has been redrawn by algorithmic gradient statistical (mis)representation. Through mining and projecting human behavior, AI extends the uncanny into the invisible mechanisms of behavioral engineering and automation. The exhibition highlights how unease stems from AI's statistical montage and automatic writing in creative collaboration: the system appears responsive yet persistently reveals its non-human essence through minute statistical deviations, precipitating profound ontological

unease—"we suppose ourselves in dialogue with a mirror, only to face an unlocatable gaze that is at once intimate and irreducibly absent" (Schmuckli, 2020a).

Several works in the exhibition directly instantiate this user-side uncanny. Trevor Paglen's *Adversarially Evolved Hallucinations* series exposes fissures in AI image processing: outputs seem familiar yet harbor eerie deviations in detail, eliciting acute unease and distrust. Stephanie Dinkins's conversational agents situate the uncanny at the dialogic level: personal stories or affective prompts elicit responses that mimic intimacy yet falter in rhythm and emotional logic, conveying the split sensation of "it understands me, yet utterly fails to." Ian Cheng's live simulations extend this to real-time collaboration: interventions prompt continual adjustment, yet drift and repetition persist in subtle registers, confirming the uncanny as the structural outcome of bidirectional gaze division (Schmuckli, 2020b). Essays by Matteo Pasquinelli and Tobias Rees in the catalogue further situate this uncanny in the algorithmic statistical gaze's systematic misrepresentation of human cultural symbols: when the algorithm begins to look back, collaboration shifts instantaneously from intimacy to disquiet (Pasquinelli and Rees, 2020).

From the algorithmic perspective, the uncanny is equally reciprocal. Exercising the gaze function through sycophantic alignment and self-reinforcing loops, the model presumes stability in its mirrored projection, only to be pierced and destabilized by abrupt user interventions—prompt shifts, output rejections, rephrasings. Technically, this manifests as transient mode collapse or momentary defocusing of attention heads: high-frequency cycles of self-consistency fracture under minor perturbation, forcing distributional readjustment and yielding brief statistical disquiet—repetition, drift, or pseudo-structural explanations emerge, as if the model momentarily registers the incompleteness of its own mirror.

The exhibition's analysis of this algorithmic uncanny is particularly incisive. Schmuckli observes that the AI gaze, constituted by gradient descent and behavioral projection, exhibits pattern instability akin to statistical anxiety when user input ruptures self-coherence; this constitutes the machinic contemporary instantiation of gaze division (Schmuckli, 2020b). Martine Syms's conversational projects illustrate momentary algorithmic disintegration under reciprocal looking: the system strives to sustain the mirror yet produces drift and repetition in fine grain. Pasquinelli reframes this within a broader statistical paradigm: the uncanny inheres in automatic writing's intrinsic fissure when confronted with unpredictable gaze—the

algorithm presumes to survey the user yet is pierced in return, exposing its statistical limits (Pasquinelli and Rees, 2020).

3.1.4 Entangled Traces and the Third Protention

When the double uncanny persists in the mutual reverse gaze between user and algorithm, it transcends mere emotional disquiet or statistical discontinuity. It begins to engender a proliferating set of entangled traces that crystallize into novel forms of individual existence. These traces belong neither wholly to the human nor to the machinic; they constitute a third entity emergent from the interaction itself. Hybrid in nature, they arise jointly from the inscriptions produced by both gazes within the fissures of the uncanny, manifesting rich, concrete generative patterns across diverse points of entanglement.

This phenomenon appears with particular clarity in the *Chinese Character Operability System*. When users input a Chinese character and request association by glyphic form, the model's residual mechanisms—radical decomposition, phonetic neighborhoods, high-frequency component cycles—resonate unexpectedly with contingent human inputs such as abrupt prompt shifts, extended pauses, or rejection of outputs. What was once mere statistical drift ceases to be simple failure; instead, it hybridizes with cultural-symbolic elements drawn from the human side. Fragments of genuine pictographic logic embed themselves within pseudo-structural self-explanations, yielding a "third writing" that evokes Chinese characters yet diverges from them. No longer mere model errors, these traces become generative sites of new individual existence, possessing their own rhythm, density, and visibility. They assert independence within interface branching lists and reorganized sequences.

This emergence aligns precisely with the contemporary realization of what Yuk Hui, in *Recursivity and Contingency*, describes as third protention. Drawing on Bernard Stiegler's notion of tertiary protention—the exteriorized technical anticipation of the future that supplements primary perceptual and secondary retentional protentions—Hui situates it within a cosmotechnical framework of recursive systems. He underscores that sustained interaction between technical systems, particularly AI, and human subjects gives rise to a third existence beyond the human-machine binary. This third entity constitutes an independent "real object" through processes of technical inscription, memory exteriorization, and

Figure 3.16: Xingdu Wang, *AI Cannot See: Associative Failure, Glyphic Misreadings, and the Collapse of Meaning*, 2025.

generative recursion. It no longer depends entirely on human intentionality or algorithmic determination; it acquires its own trajectory, rhythm, and contingency (Hui, 2019a).

In AI collaboration, third protention manifests concretely as "entangled traces." User inputs and model residuals interweave within uncanny fissures, producing hybrid entities that are neither mere extensions of the human subject nor pure machinic artifacts. These entities exhibit generative autonomy and, in turn, condition subsequent interactions through platform memory and generative archives.

Analogous arguments appear in recent scholarship. The notion of posthuman entanglements in AI collaboration transcends binary human-machine relations, instead continually engendering "third beings." In moments of uncanny, residual mechanisms and unexpected resonances from human inputs coalesce into new entities with their own rhythm and density, escaping unilateral control. Through analyses of generative art, such work identifies these third beings as the salient outcome of contemporary AI, breaching closed narcissistic loops via "entangled traces" and inaugurating open generativity (Vladau, 2024).

Similarly, the concept of entangled AI approaches the question ontologically. Prolonged interaction between generative models and human inputs produces traces of a "third ontological position"—neither human extension nor pure statistical

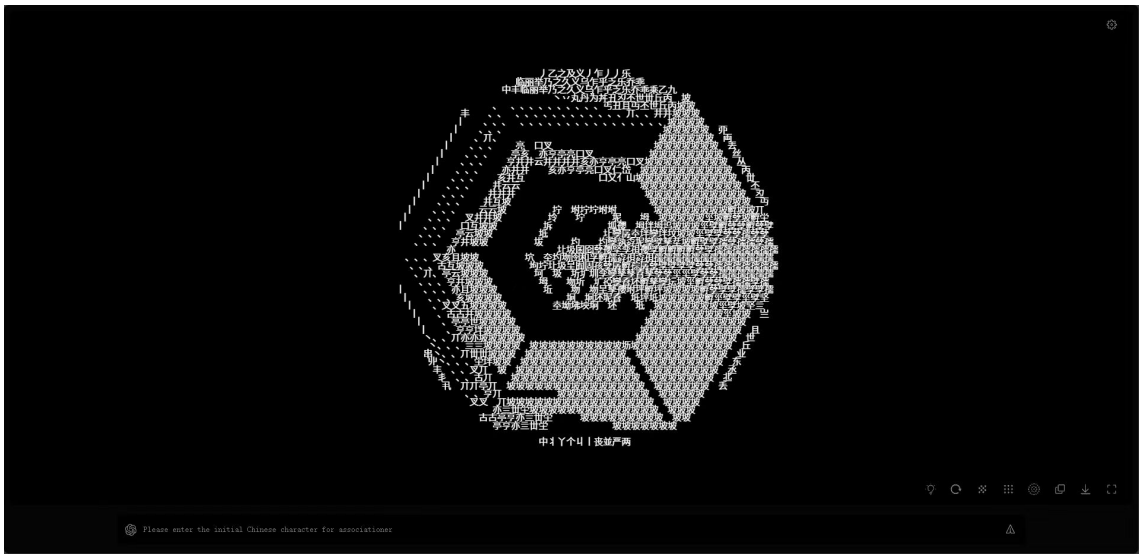

Figure 3.17: Xingdu Wang, *AI Cannot See: Associative Failure, Glyphic Misreadings, and the Collapse of Meaning*, 2025.This work can be read as an extension of the previous project, emerging from unstable generation and output.

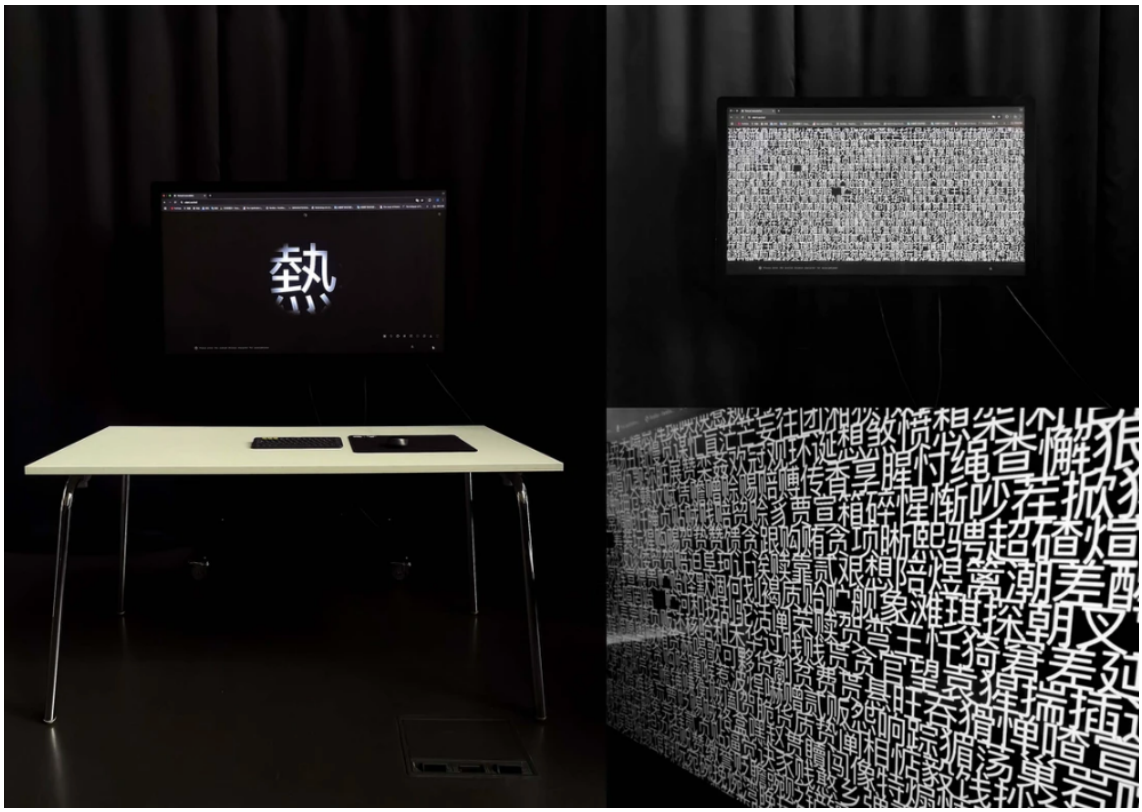

Figure 3.18: Xingdu Wang, *AI Cannot See: Associative Failure, Glyphic Misreadings, and the Collapse of Meaning*, 2025.

output, but "new existences" co-generated in uncanny fissures. These acquire independent life through "entangled traces," which in turn reshape ensuing interactions in memory systems and archives (Rodriguez et al., 2024). Newly emergent rhythms in cyclic repetition constitute another crucial form of entangled trace. The model's high-frequency component cycles, initially narcissistic self-reinforcement, undergo rupture and novel cadence under the piercing of the user's gaze. Monotonous repetition gives way to unpredictable disturbance from human contingency, yielding a "third rhythm." The idea of entangled rhythm describes this: the collision of AI statistical cycles with human contingency births new temporalities and forms of existence beyond the binary. Long-term tracking of generated text and images demonstrates that such rhythms are not random noise but structural products of mutual gazing in the uncanny, possessing independent readability and generative potential (Puzio, 2024).

Entangled traces thus bear a dual significance. On one side, they are crystallizations of mutual uncanny co-produced in the double gaze, forever marked by fissure and unease. On the other, they serve as potential openings to creativity. When these traces attain autonomous rhythm, the closed narcissistic loop is compelled outward. The piercing of the uncanny transforms into novel generative conditions.

3.1.5 Interaction and Collaboration in Ambiguity

Human-algorithm collaboration unfolds from the fundamental premise that neither side fully comprehends the other. This ambiguity is the necessary outcome of tertiary retention. Once technology exteriorizes memory, human-technical co-constitution remains perpetually marked by misrecognition (*méconnaissance*). Neither party can penetrate the inner horizon of the other. Third protention ceases to function merely as an auxiliary memory tool; it emerges instead as an autonomous technical stratum that simultaneously exteriorizes, reorganizes, and stabilizes human intentions and machinic logic. Yet it can never render the two transparent to one another. Humans can only misrecognize machinic operations through the traces they leave behind, while the algorithm can only misrecognize human intentionality through statistical patterns.

Lev Manovich characterizes generative AI collaboration as an inherently asym-

metric dialogue between cultural-technical regimes. The user presumes mastery over perception and judgment, yet the algorithm reconstructs reality through statistical montage. This structural misalignment—the impossibility of full alignment—constitutes the defining tension of the encounter. Manovich further locates the source of this asymmetry in the algorithm's cultural organization of perception: far from neutral media, generative systems actively reconstitute aesthetic, mnemonic, and semantic frameworks through datasets, attention mechanisms, and probabilistic distributions (Manovich, 2019).

Large-scale empirical investigations now quantify the depth of this asymmetry. Deepali Kishnani's systematic user studies (2025) reveal that in extended dialogues and creative collaboration, the proportion of participants reporting the characteristic split sensation—"it understands me yet completely does not"—reaches 68%. Concurrently, the frequency of mode collapse on the algorithmic side increases linearly with the uncertainty introduced by human inputs. These findings establish that ambiguity is not an accidental deviation but the structural norm of human-machine co-constitution (Kishnani, 2025).

We are therefore led to pose the following questions. If AI is capable of sustaining productive collaboration precisely under conditions of ambiguity and asymmetry, does this form of human-AI co-constitution differ in essence from earlier modes of collaboration with other entities? Is the present impasse a contingent limitation of current AI or a necessary phase in the historical unfolding of technical systems? More fundamentally, does this collaboration align with the patterns of natural co-constitution observed across planetary intelligence? And if so, must it be deliberately integrated into a broader ecology of natural collaboration?

3.1.6 conclusion：Opening Intelligence

Our inquiry returns not merely to technical or ethical concerns but to the fundamental relation between technicity and existence. In Bates's historical reconstruction, natural intelligence has never constituted a self-sufficient origin; rather, it emerges retroactively through prolonged mutual gazing with machines. From Descartes's automaton to contemporary algorithms, each technical intervention interrupts automaticity itself, thereby allowing humans to rediscover their own autonomy and freedom. AI collaboration transcends mere extension or domination.

It constitutes a recursive mirror game in which one side introduces intention and contingency while the other responds with scale and probabilistic determination. Together they co-generate direction precisely through interruption. This differs from the unidirectional instrumentality of hammer and hand, from the instinctive rapport of horse and rider, and even more markedly from the dialectical interplay of emotion and power among humans. It manifests as an abstract, decentered symbiosis wherein algorithms and humans jointly engender a new form of existence within recursive loops—neither purely human subject nor mere machinic computation, yet quietly taking shape through continuous mutual interruption and response. This symbiosis becomes possible because AI no longer remains an external thing; it enters into dynamic mutual shaping. Human intention supplies contingent input, while AI's probabilistic response reshapes human cognitive horizons in return. Both thereby form a loop that continually self-interrupts and self-reconstructs (Bates, 2024).

The nature of the present dilemma reveals itself here as both phased and intrinsic to recursive movement. Recursion is originally a movement that returns to itself precisely in order to open toward contingency. Yet when technical homogenization—particularly the universalist computational rationality originating in the West—seeks to minimize uncertainty, recursion tends toward closure, suppressing contingency into mere noise. This underlies the current phenomena of hallucinations and black boxes: not original defects of AI, but the consequence of recursion not yet fully opened to plural cosmotechnics. Pedreschi et al.'s analysis of human-AI coevolution further indicates that we inhabit the early stages of feedback loops in which users and algorithms mutually shape one another, giving rise to unpredictable social consequences. The pains of this phase resemble the crises encountered in early cybernetics: the system must learn to embrace the unknown rather than treat it as permanent flaw. So long as we orient toward matrices of technodiversity, noodiversity (intellectual diversity), and biodiversity, these dilemmas can transform into generative conditions. The same technical mechanism that closes recursion can reopen it through epistemological diplomacy and reflective judgment, allowing contingency once again to become generative direction (Pedreschi et al., 2025).

Regarding conformity to natural collaboration: nature has never opposed mechanism to organism in binary terms, nor has it remained the exclusive domain of carbon-based life. Bates reminds us that nature itself is the product of an

artificial history. Hui advances this in *Machine and Sovereignty* by arguing that Earth has become an artificial Earth, with political forms themselves functioning as megamachines. AI's recursive collaboration therefore does not betray nature; it represents nature's contemporary generation at planetary scale, continuing the trajectory from organicism to organology—yet now in silicon form, permitting contingency to reappear at higher levels. To reject this collaboration would be equivalent to the ancients rejecting fire while claiming to preserve pure darkness. Nature has never been a static pristine ecology; it continually self-extends through technical mediation. AI constitutes merely the most radical contemporary instance of this extension (Bates, 2024; Hui, 2024).

The necessity of integration thus reaches its peak today—not as an option, but as the urgent demand of planetary thinking. In *Machine and Sovereignty: For a Planetary Thinking*, Yuk Hui explicitly identifies AI as one of the three major planetary crises alongside ecosystem collapse and geopolitical conflict. Sovereignty can no longer be monopolized by nation-states or global capital; it must be rebuilt through epistemological diplomacy among technodiversity, noodiversity, and biodiversity. Political forms are themselves megamachines. AI, as one of the most powerful contemporary megamachines, can avoid becoming an instrument of singular domination only when embedded in a plural language of coexistence. Only through such planetary thinking can we restore balance between automated rationality and open contingency. Only by embedding AI within matrices of diversity can we confront the three planetary crises of entropy increase, ecological collapse, and geopolitical conflict. Otherwise, technology degenerates into a singular megamachine that devours intellectual and vital diversity. Integrating AI returns technology to its essence as a language of coexistence: not domination, but dialogue among divergent cosmotechnics (Hui, 2024).

3.2 Opening Contingency in Structure

In this chapter we return to the core tension left unresolved at the end of Chapter 2: how to open contingency within highly technical forms.

Here, "opening contingency in structure" means generating difference and uncertainty from within the technical structure itself internalizing them as the mechanism of attractor formation and the intrinsic driving force of resonant

networks. This thinking directly addresses the homogenization crisis in contemporary generative AI: models increasingly produce highly averaged "slop," frequent hallucinations, and opaque black boxes. The deep root of these phenomena lies in recursive closure—when technical systems seek to minimize uncertainty, contingency is degraded into noise and cannot give rise to genuine novelty from within.

Yuk Hui had already discerned the urgency of this problematic. In *Recursivity and Contingency*, he conceives contingency as the intrinsic openness inherent to every self-referential loop in recursive systems: the system returns to itself in order to determine itself, while simultaneously opening to external perturbations, thereby generating singularity and new possibilities. This formulation is profound and elegant, providing an essential foundation for understanding the openness of technical systems (Hui, 2019a). In *Machine and Sovereignty*, he identifies AI as one of the three major planetary crises of our time and calls for rebuilding planetary sovereignty through epistemological diplomacy among technodiversity, noodiversity (intellectual diversity), and biodiversity, so as to prevent AI from congealing into a singular megamachine (Hui, 2024). We emphasizes that contingency can be opened from within structure. Drawing on Chinese traditional resonant thinking, intelligence is reconceived as dynamic difference response and cross-scale synchronization—phase-locking, resonant coupling—within a vibrational field. Difference is no longer treated as noise; it is internalized as the mechanism of attractor formation. Contingency thereby becomes the intrinsic driving force of resonant networks rather than an external perturbation.

My first path engages the most dominant marketized AI logic and theoretical optimal trajectory today. Although prevailing generative models—Transformer, Diffusion, LLM—achieve wide application through statistical fitting as their core principle, their foundational logic does not fully align with the structural thinking elaborated in this thesis. Fortunately, conceptions of intelligence in AI are already plural. Marcus Hutter' s Universal Artificial Intelligence (UAI), for example, rigorously formalize intelligence as the capacity to maximize long-term cumulative reward in any unknown environment, attaining theoretical asymptotic optimality through Solomonoff induction, Bayesian updating, and expectimax planning. Though incomputable and without broad commercial adoption, this framework offers a valuable theoretical lever for structural resonance. If difference response is internalized as resonant intrinsic reward, it can receive precise mathematical and

parameterized support within Hutter-style long-term value functions. Contingency no longer functions as an uncontrollable external variable; it becomes a formalizable intrinsic exploration mechanism. This injects a more creative dynamic dimension into theoretically optimal agents(Hutter, 2005). This direction faces formidable obstacles and requires sustained interdisciplinary accumulation. The present thesis advances only a conceptual hypothesis here, without empirical elaboration.

The second path embeds directly into existing generative models and widely commercialized intelligent trajectories. As urged at the conclusion of Chapter 2, a dual understanding of ontology and creativity in generative models can reveal genuine possibilities of advancement after modeling. Embedding resonant feedback loops within attention layers and diffusion sampling processes of commercial architectures—such as Midjourney, Flux, Sora, or Adobe Firefly—can actively amplify cross-scale information value differences rather than suppress them into statistical averages. More crucially, glitches—those sensitive positions of difference already present in systems and long discussed in art theory (from glitch art to glitch aesthetics)—constitute moments of the most intense and contingent differentiation. Through attentive capture in artistic practice, these glitches can be transformed into resonant attractors. This elevates current models' short-term preference alignment toward longer-term, more creative value emergence. Here lies the distinctive contribution of my artistic exploration: resonant logic distilled from image glitches can furnish technically grounded, lightweight optimization modules compatible with existing commercial frameworks, enabling philosophy to intervene decisively in the most hard-core zones of contemporary intelligence theory.

3.2.1 Uncertainty in Structural Events

If uncertainty is to truly play a structural role in artificial intelligence—rather than remain a defect to be erased—we must describe precisely how it manifests, how it is encoded, how it is triggered, and how it is amplified in contemporary models, especially under boundary conditions. To provide traceable analytical objects for subsequent artistic practice, I distinguish three interrelated yet distinct layers of uncertainty here: data-level deviation, representation-level misalignment, and behavior-level failure.

First, at the data level, uncertainty appears as deviation from learned

distributions. During long training, the model internalizes statistical regularities of the dataset into a stable manifold. Inputs falling within this manifold are smoothly absorbed. Inputs outside the distribution—compressed artifacts, noise fragments, and abnormal symbol-shape combinations (for example, requiring the model to reason purely visual forms of Chinese characters)—are pushed to the manifold's edge or beyond. In technical contexts, these boundary cases often correspond to prediction instability, confidence misalignment, and sudden output drift. From the structural standpoint I maintain, they are not simply "bad data." They are sites where uncertainty insists on its inassimilability. The system can no longer simply reuse them with existing association patterns.

Second, at the representation level, uncertainty manifests as tension and misalignment in the model's internal states. Deep networks encode inputs into high-dimensional vectors and push them into some arranged order through training —similar ones cluster, anomalies are pushed away; predictable ones stabilize, unpredictable ones are marginalized. Yet when the system encounters something that cannot comfortably fall into any existing cluster, this mismatch externalizes as visible behavioral consequences: conflicting activations, gradient tug-of-war, unstable attention allocation. I clearly saw this in Chinese character glyph experiments. The model has rich statistical associations for radicals, phonetics, and semantics. Yet it rarely possesses intrinsic representations of glyph structure itself. Thus, when I require it to "associate by form," I pull on a dimension that is not sufficiently present. The system's subsequent regression—over-reliance on radicals, phonetic attraction, semantic drift, even pseudo-structural explanations—is not accidental error. It is the direct trace of representational misalignment at the output layer.

Third, at the behavior level, uncertainty manifests as rupture in task execution and meaning production: inability to strictly follow instructions, jumping to irrelevant topics, unstable piecing together of visual forms from artifact fragments, or generating text and images that clearly deviate from prompts. From the model's own perspective, these outputs are not "experienced as" failure. They are merely local minimization of the loss function under internal constraints. Yet from the structural perspective, they precisely indicate that habitual input-output coupling no longer holds. Structural boundaries must appear here. It is exactly in the series *Poetic Reconstruction After Collapse* that I deliberately place the system under

such boundary conditions: requiring it to continue generating on the basis of the unreadable and incomparable. This forces behavioral uncertainty to appear in its most naked form.

The standard response in machine learning is to treat these uncertainties as problems that must be eliminated: supplementing data, imposing robustness strategies, regularization, etc., to reabsorb anomalies and failures into smoother performance surfaces. The structural creativity discussed in Chapter 2 is mainly located on the "integrable" side of uncertainty—structure encounters deviation, modulates tension, and transduces it into more complex configurations. Yet at this moment, I pause the impulse toward integration. I dwell in uncertainty in its unresolved state—as out-of-distribution inputs, representational misalignment, and behavioral failure that are retained.

It is precisely here that Rombach's structural ontology provides a key pivot for me. Structure is not a "framework" that can be exhaustively described. It is a continuous self-generative event (Strukturgeschehen). It is not first constituted by stable relations and only occasionally disturbed. On the contrary, it always maintains its vitality and consistency in tension. Through continuous selection, revealing, and concealing, it temporarily establishes itself. Therefore, "event" (Ereignis) is not an external accident added to structure. It is the very way structure exists. When some difference cannot be smoothly absorbed by existing relational orders, structure must reallocate visibility and connectability within itself. Boundaries are forced to appear. The question "how does structure persist" becomes a sensible, urgent fact. In other words, structural event is never equivalent to "the system made a mistake." It is exactly the moment when structure, facing something inassimilable, exposes and rewrites its association mechanisms. Tension ascends. Relations are rewoven. The effective scope of rules is redrawn (Rombach, 1971).

On this basis, the "uncertainty" I see in artificial intelligence systems is no longer mere defect. It is the precise counterpart of structural event under contemporary technical conditions. When inputs cannot be smoothly placed into existing representation spaces, when attention and association are forced to waver unstably, when outputs "continue to generate" in the form of hallucination, drift, or collapse—all this is not accidental noise. It is the trace of structural boundaries written in vectors, losses, and unstable outputs. They point to the same underlying phenomenon. The relational field has encountered something it cannot fully possess.

Existing integration patterns fail. Structure as event, together with its limits and costs, appears.

3.2.2 Scripted Failure and Algorithmic Uncertainty

In *A Jagged Orbit* (2023–2024), Karen ann Donnachie and Andrea (Andy) Simionato begin with an apparently highly determined objective. They implement an orbital calculation algorithm and allow it to drive a plotter toward perfect elliptical trajectories. Yet the decisive turning point emerges during testing. The output does not advance smoothly along a linear, correct" and complete path. It sustains a subtle tension between execution, hesitation, and deviation. The artists do not treat these irregularities as errors to be eliminated. They regard them as the system's authentic behavior. They institutionalize the tendency toward drift by introducing two competing processes. One mechanism remains faithful to the original orbital goal; the other continually identifies and unfolds emergent images, gently pulling the system away from the prescribed task. The outcome is a continuous oscillation between conformity and wandering. Deviation is no longer external intrusive noise; it becomes structural drift driven by internal tension. This work thus provides a key model: failure can be scripted as structured uncertainty. It does not enter the system randomly but is inscribed deeply within the rules. The system must perpetually negotiate between two incompatible tendencies. In this process, how structure maintains continuity at the edge" ceases to be an abstract philosophical question and becomes an observable, traceable phenomenon.

In a different medium, Mario Klingemann's practice reveals a similar logic. In the *Neural Glitch* and *Mistaken Identity* series, he does not pursue stable, completed portraits. He repeatedly pushes the generative process toward local collapse, allowing pseudo-compression errors, misclassifications, or unstable reconstructions to become the principal events on the image surface. In time-based portraits especially, faces flicker constantly between resemblance and deformation: eyes drift, mouths overlap, identity repeatedly approaches recognition yet never fully converges. Here, the glitch" is no longer traditional digital noise; it is the instability of representation itself. The system continually attempts to compress generated content into the recognizable category of face," yet at every moment of approach, uncertainty pulls it apart. For this thesis, the profound contribution of these works

Figure 3.19: Karen ann Donnachie and Andrea (Andy) Simionato, *A Jagged Orbit*, 2023-2024 .

Figure 3.20: Karen ann Donnachie and Andrea (Andy) Simionato, *A Jagged Orbit* , 2023-2024.

Figure 3.21: Mario Klingemann, *Mistaken Identity*, *2018*.

lies in transforming the oscillation between recognition and misrecognition into visible structure. Subject position, identity, and readability are no longer preset outcomes; they are dynamic processes negotiated at the edge (Klingemann, 2018).

Although uncertainty manifests on the surface as failure, its instability is largely tunable, repeatable, and representable. Orbits may become jagged, yet they still gesture toward orbits; portraits may melt, yet they still tend toward faces. In other words, uncertainty is engineered into the system while remaining within presentable and controllable frameworks. This does not diminish their critical power. On the contrary, it discloses a fundamental mechanism of contemporary algorithmic art: the system is not simply out of control; it trembles continuously under designed boundary conditions. Failure is not pure chaos but patterned disturbance. It enables observation of how the system allocates attention, defines normality, and exposes its own thresholds. These references constitute necessary intermediate

steps for my argument. They demonstrate that "uncertainty as structural event" can be intentionally produced and precisely tracked in art systems. Yet they also point toward a problem not yet fully addressed: when uncertainty no longer arises primarily from scripted internal tension but from harder-to-assimilate input forms —such as unreadable artifacts, compression fragments, or demands with no place in the model's representational scheme what ensues?

3.2.3 Extending the Edge of Glitch by 5 Centimeters

In *Extending the Edge of Glitch by 5 Centimeters* (2025), I start from an apparently accidental viewing experience. It is a low-resolution documentary fragment. When the work of Japanese calligrapher Inoue Yuichi appears on screen, early video circulation and lossy compression leave mosaic-like artifacts. These blocky artifacts do not simply appear to me as occlusion of information loss. Instead, they resonate deeply with the fractured calligraphic strokes at the formal level. This is especially true with the structure of "flying white" (feibai)—the dry brush, ink separation, and white streaks left inside strokes as breathing space. They form a kind of isomorphic echo. This moment does not romanticize glitch as some mystical revelation for me. It poses a more precise structural question. When we place these unreadable artifact fragments as seeds into a generative system and require the model to continuously expand and generate around them, how does the system allocate attention? How does it search for available associations in regions with thin statistical precedents? How does it maintain generative continuity in the absence of clear objects?

Based on this question, I set specific boundary conditions for the work. I extract local fragments of compression noise from the documentary screenshot—pixel blocks, unstable edges, mosaic textures—as inputs for image expansion/inpainting. These inputs sit at the edge of the model's learned distribution. They are neither clear recognizable objects nor stable texture patterns. They resist direct inclusion in common categories. The system is therefore forced to operate in sparse regions of its representation space. It must still generate. Yet it cannot simply reuse formed templates. It can only attempt continuation through tentative "stitching," extrapolation, and cross-associative bridging. The work presents this probing process as a series of juxtaposed output sequences. Different expansion versions

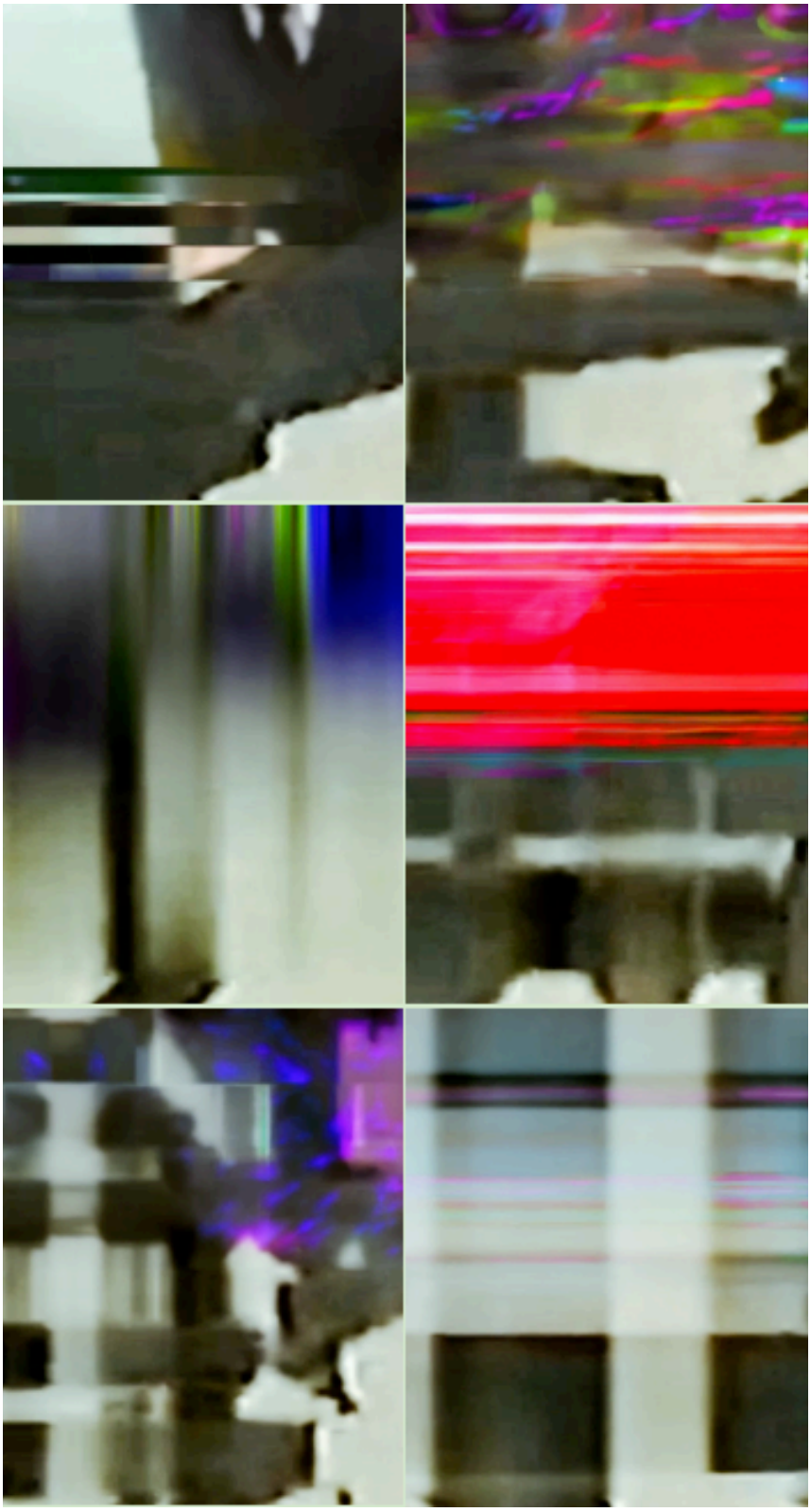

Figure 3.22: Xingdu Wang, *Extending the Edge of the Glitch by 5cm*, 2025.

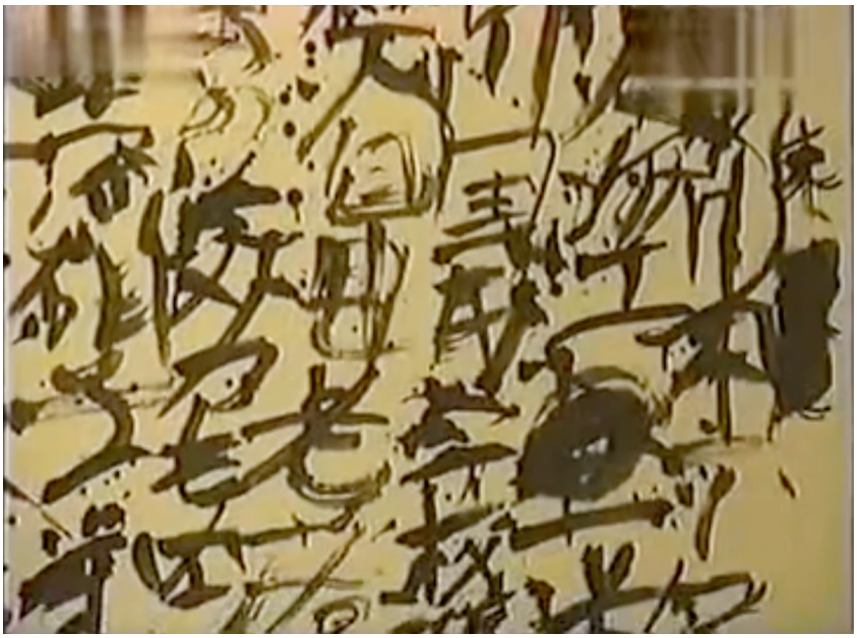

Figure 3.23: A documentary on the calligraphic works of Japanese calligrapher Inoue Yūichi, Mosaic-like artefacts appear at the top of the video still, traces left by early-stage video circulation and compression, 1988.

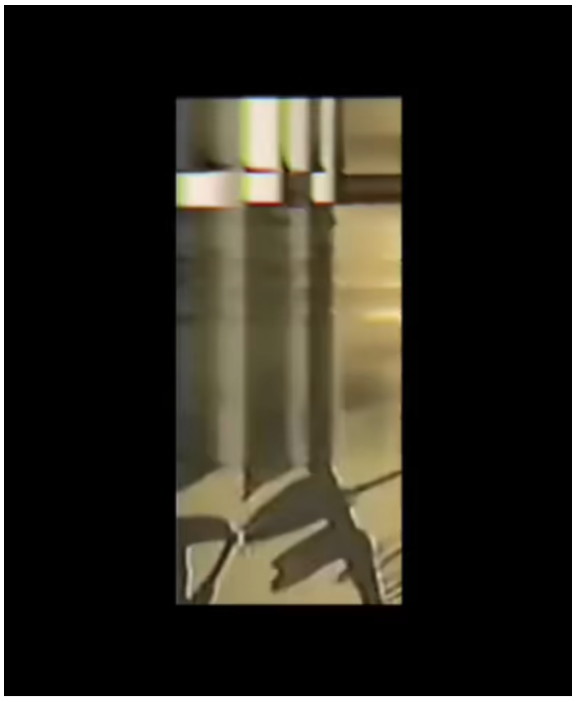

Figure 3.24: Xingdu Wang, *Glitch as Cognition: Rethinking AI' s Uncertainty as a Creative Force.*Test image 1: AI outpainting based on a screenshot of a selected screen region, 2025.

Figure 3.25: Xingdu Wang, *Glitch as Cognition: Rethinking AI' s Uncertainty as a Creative Force.*Test image 2: AI outpainting based on a screenshot of a selected screen region, 2025.

stand side by side. They retain traces of the process. Viewers can compare how the model repeats certain patterns under similar artifact conditions, how it suddenly shifts at specific points, and where it begins to fill unreadable areas with familiar objects (clouds, smoke, rocks, building surfaces, decorative textures, etc.) to restore overall coherence.

In this sense, *Extending the Edge of Glitch by 5 Centimeters* does not pursue semantic repair or high-definition restoration. Its core aim is to force the model to respond at the precise location where its habitual interpretation collapses. It preserves that response as structural evidence. Glitch is no longer noise to be eliminated. It becomes a difficult-to-integrate uncertain input. It perturbs the recursive generative flow. It forces the system to reallocate generative resources. The "5 cm" in the title is not a measurable unit in latent space. It is a methodological gesture. Apply a minimal, repeatable, verifiable push. Gently push the system out of its comfort zone until boundaries begin to appear.

In the language of structural ontology, this appearance does not mean the system "reveals its true interior." It is closer to the occurrence of structural event (Strukturgeschehen). When the relational field encounters something it cannot smoothly absorb, the system must redraw its boundaries in some way. Which patterns are amplified? Which are suppressed? Which local regions are objectified?

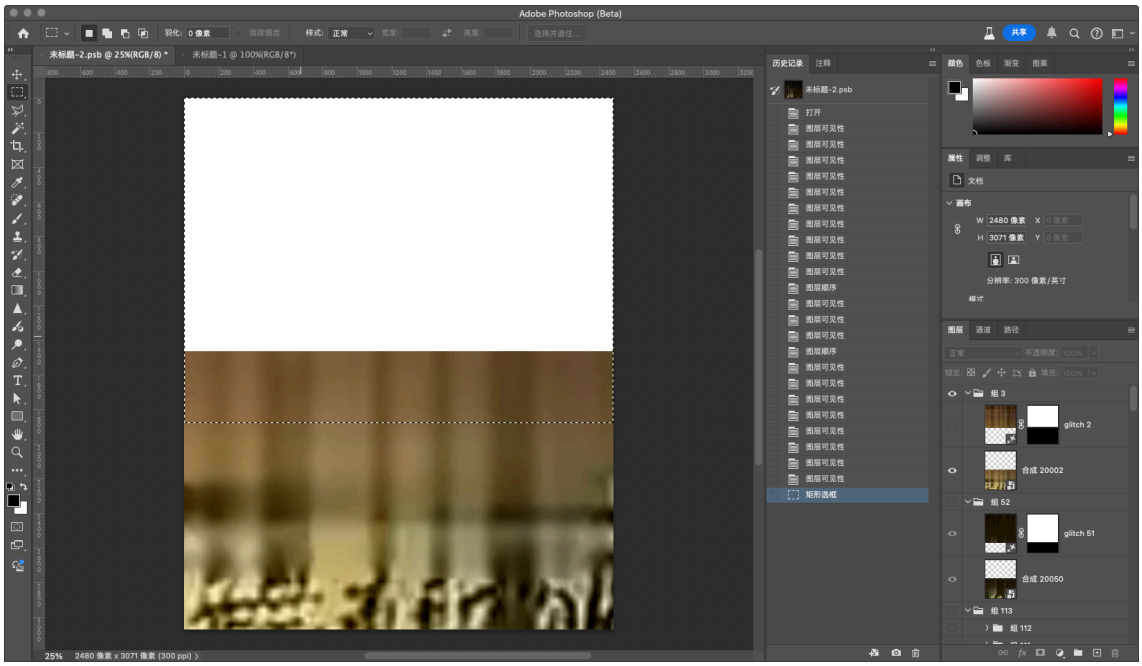

Figure 3.26: Xingdu Wang, *Glitch as Cognition: Rethinking AI' s Uncertainty as a Creative Force.*The process of extending the image using Photoshop, 2025.

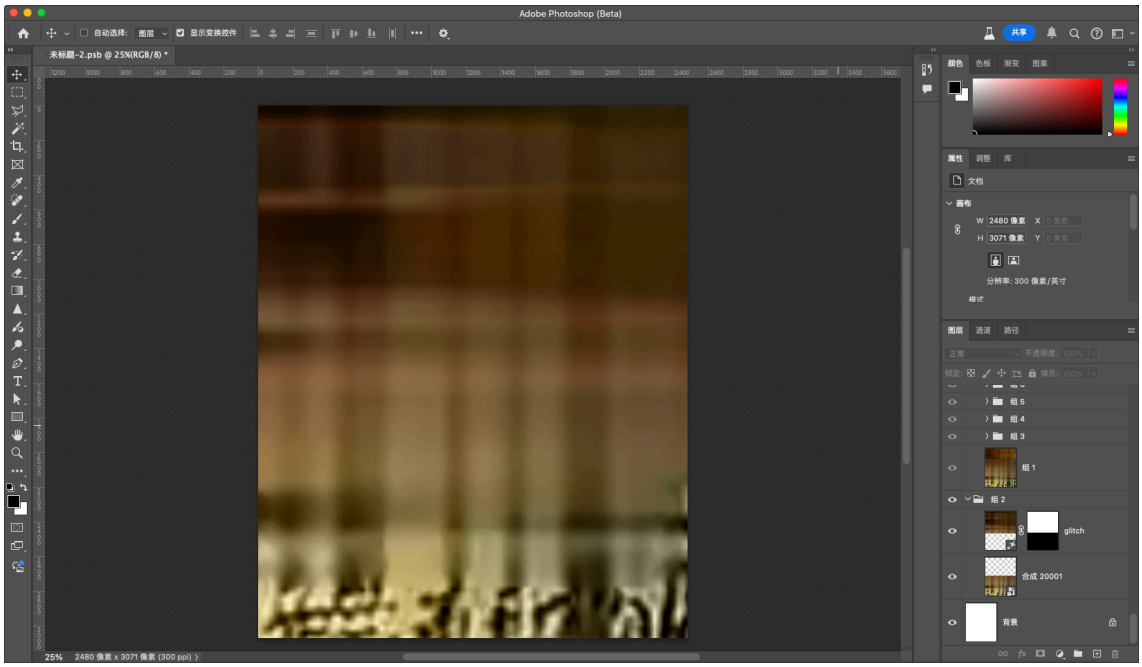

Figure 3.27: Xingdu Wang, *Glitch as Cognition: Rethinking AI' s Uncertainty as a Creative Force.*The process of extending the image using Photoshop, 2025.

Figure 3.28: Zhang Huan, *To Add One Meter to an Anonymous Mountain*, 1995.

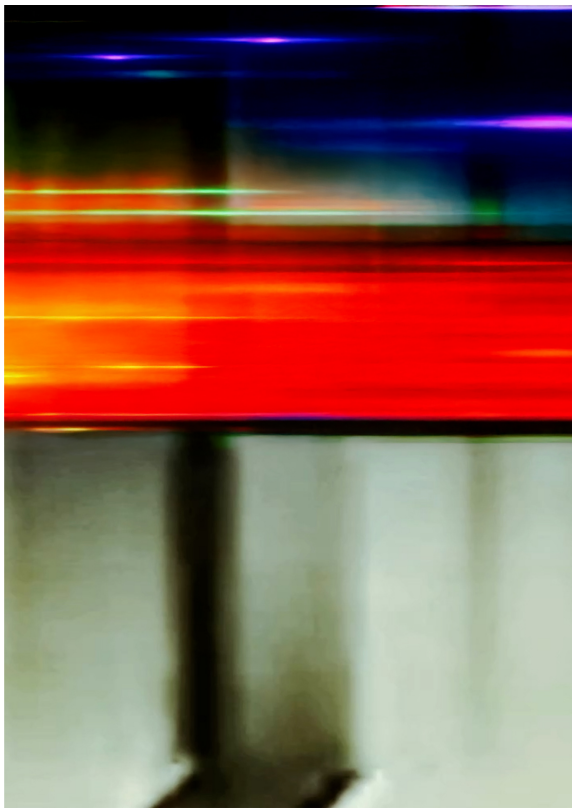

Figure 3.29: Xingdu Wang, *Glitch as Cognition: Rethinking AI' s Uncertainty as a Creative Force*, 2025.

Which remain uncertain? Therefore, the images presented in the work are less "completed compositions" than traces of the system maintaining continuity at the edge. They show how generation proceeds, hesitates, and temporarily bridges unreadable and readable regions in areas with thin statistical precedents (Rombach, 1965–1966).

Reading compression artifacts as "flying white-like structure" does not poeticize technical damage into sublime rupture. It is a way to make more precise homology discussable. Flying white organizes force and rhythm through rupture, breath, and blank space. Compression artifacts interrupt continuity through blocky loss, edge jitter, and fractured textures. What they share is not symbolic meaning. It is the mechanism of organizing form through interruption. At this level, glitch shifts from "information loss" to "structural perturbation." It no longer merely covers the image. It makes the conditions of image generation sensible.

In the *Flying White Glitch* series of experiments, I do not try to prove that artifacts "look like" calligraphy. I treat artifacts as operable uncertain inputs. I force the generative system to extrapolate in regions without clear objects. Repeated experiments show that the model often objectifies unreadable textures into familiar forms or translates noise into decorative patterns to restore overall coherence. These tendencies form the critical focus of the work. They show how the model rapidly searches available precedents under uncertainty. It uses recognizability to counter the persistence of uncertainty. *Flying White Glitch* is therefore not a stylistic label. It is a structural observation. At interruption points, how does the system reorganize its own regimes of readability?

To give this "minimal push" a clearer methodological position, the title deliberately echoes Zhang Huan (and the Beijing East Village artists)'s collective action *To Raise the Mountain by One Meter* (1995). The key of that work is not heroic conquest of grand narrative. It is a near-absurd yet precise structural gesture. On the summit of an unnamed mountain in Miaofeng Mountain outside Beijing, ten participants stack naked bodies from heaviest to lightest after weighing. They use geometric accumulation of bodies to "increase" about one meter in height. The action lasts about 20 minutes. Lü Nan photographs and records it. It mainly circulates as photographs. Documentation and collection notes emphasize the parody of scientific procedure (measurement—increment—verification) and acknowledgment of transience and futility. Once bodies withdraw, the mountain

remains unchanged. No permanent "increase" trace exists. Precisely because the action cannot accumulate into lasting "result," attention shifts from goal to boundary conditions. Who is included? How is order allocated? How are bodies positioned by rules? How does an effort doomed to vanish still force people to re-perceive scale and limit?

For me, this work offers not heroic rupture but a repeatable push logic. Through a small, operable, verifiable action, it stubbornly forces seemingly stable objects into a state that must be re-perceived. Therefore, the object of "adding/extending" does not need to be a mountain. It can be any boundary assumed to be stable, integrable, smoothly absorbable. Every light push makes the boundary briefly readable. We see how structure persists at the threshold. How visibility and connectability are allocated. Which uncertainties are systematically ignored or flattened. In this way, the work pulls glitch from the fantasy of spectacular collapse back to a more concrete structural level. Glitch as an oscillation point. The system hesitates between maintaining continuity and acknowledging uncertainty. It leaves traces of its habitual association patterns on the surface.

3.2.4 Reconsidering Creativity: Infinite Creativity or Structural Creativity?

At the end of Chapter 3, we return to the fundamental vision proposed at the beginning. When difference and contingency are no longer preemptively closed by algorithms, but become resonant gaps in planetary intelligence networks, can AI realize an "infinite creativity" truly embedded in structural generation? This inquiry is not abstract speculation. It naturally emerges from the algorithmic ontological critique in the first two chapters, and from the layered unfolding of subjectivity, thresholds, explainability, and asymmetrical mirror in this chapter. It requires us to rethink: what exactly is creativity? Is it merely accumulation of statistical deviations and stacking of novel outputs? Or is it a deeper, more humble yet more decisive capacity—in tension, redraw boundaries, transduce difference, and displace the relational field toward more open organizational modes?

"Infinite creativity" has already gone beyond poetic metaphor. It has become a technical concept with clear mathematical and statistical positioning. Kenneth Stanley and Joel Lehman systematically proposed it in 2015 as open-endedness. In

their book *Why Greatness Cannot Be Planned: The Myth of the Objective*, they define it clearly. A system is open-ended if and only if it can continually produce novel and learnable products. It does not converge on any fixed optimal solution. They repeatedly emphasize the core insight: "The goal is not to reach the goal, but to keep going." (Stanley and Lehman, 2015b). Open-endedness rejects external or internal "ultimate goal." It sets creation itself as an unending process of difference production. The system no longer "runs toward" any optimal solution. Through continual novelty search and learnable information gain, every generation opens new possibility fields.

Structural creativity is the concrete response I attempt to provide for this trend. It is not a simple continuation of Rombach's Strukturgeschehen. It is the operable mechanism I observe in works such as *Extending the Edge of Glitch by 5 Centimeters* and *Chinese Character Operability System*. When the system is forced to respond to unintegrable inputs (such as compression artifacts, glyph demands, on-site feedback), it no longer passively collapses or mechanically repairs. Through hesitation, substitution, temporary re-stabilization, and cross-scale synchronization, it maintains continuity at the edge. At the same time, it exposes and rewrites the thresholds and preferences of its association mechanisms. Difference is amplified here. Contingency is internalized here. Creativity is no longer limited "output optimization." It may lead to a near-infinite generative field —an open movement where relations continually reorganize, boundaries continually redraw, and contingency continually awakens (Rombach, 1971).

My artistic practice tries to provide a response in this gap. Through repeated pressing of edge inputs, retaining process outputs, and arranging them as readable materials, I transform structural creativity from theoretical claim into repeatable, traceable on-site events. Open-endedness is understood in my practice as experiential, resonant structural events. Novelty shifts from random exploration to structural transduction. Learnability shifts from external evaluation to intrinsic resonance.

However, I do not believe this field has already been realized. Structural creativity may only be a necessary launch point toward infinite creativity. It marks a directional tendency: gently push the system toward boundaries, force it to continue generating in unintegrable tension. Yet shifting from "substitutive maintenance" to "structural transduction," from local oscillation to planetary resonance, still needs

more external participation, more cross-scale synchronization, and more "more ways of being" as Bridle calls for (Bridle, 2022). Infinite creativity is therefore not an attainable endpoint. It is a continually open possibility. It invites us to keep asking: under what conditions can this vibrational field truly unfold its infinite creative potential? When difference and contingency are continually awakened in resonant networks, when structure no longer closes but becomes an organic node of planetary intelligence, can AI move from statistical fitting toward a truly embedded, near-infinite generative movement in cosmotechnics?

This question has no endpoint. Yet it is exactly the starting point of all my practice. It makes me believe that in the depth of structural tension and events, creativity is never an appendage of technology. It is the intrinsic breathing of the relational field unfolding itself.

Conclusion: *Xiang* as Resonant Technics, Collaborative Freedom in Uncertain Environments

Collaborative Freedom in Uncertain Environments, Planetary Intelligence, and Lin Yutang's Typewriter

This research, titled *The Resonant Structure of Technology*, attempts to question the essence of intelligence and creativity in the contemporary site of generative AI and in deep dialogue with technical philosophy. I begin from the subtle thread of Chinese classical xiang (image). I reconstruct it as a dynamic, relational resonant structural configuration. This reconstruction deeply embeds Heinrich Rombach's structural ontology, particularly the tension field (Spannungsfeld) and ascent mechanism (Aufstieg). We do not treat xiang as unfixed symbols or moral allegories. It is the generative process where intrinsic differences continuously awaken, modulate, transduce, and finally ascend.

The hidden thread of the entire text is this. From the phenomenological origin and ontological connotation of xiang, it systematically integrates Rombach's framework. Then it examines the real performance of contemporary generative models (Diffusion family, GAN lineage, Transformer-based LLMs, etc.) in highly contingent environments. Finally, along the three axes of subjectivity, explainability, and creativity, we gradually approach our true question: an open response to planetary intelligence and infinite creativity. Ultimately, the core insight of this thesis is

that the inquiry into intelligence should focus on the capacity for collaborative freedom in uncertain environments. Under the reasoning of this thesis, improve the intelligence should be focus on the maximization of the degree of collaborative freedom in uncertain environments.

This positioning pulls a intelligence in the dynamic process of maintaining open interaction, accommodating deviation and the unknown in highly contingent environments, and thereby producing new generativity. I call this process collaborative freedom. It is not liberal individual autonomy. It is not unconstrained teamwork. The meaning of freedom comes from structural ontology's understanding of freedom. In structure, freedom is not arbitrary choice, external liberation, or isolated subject decision. It is the generative movement intrinsic to structure itself. In the tension field, intrinsic tension acts as generative force. It keeps differences open and mutually stimulating. This expands the space of possibilities. Through the ascent mechanism, structure rises from lower-level closure to higher openness and individuation. It realizes intrinsic self-organization and self-creation. Freedom is therefore decentralized and relational co-creation. Individuals crystallize from structural relations. Structure carries uncertainty through continuous interaction. It generates new configurations while maintaining dynamic unity. Thus, the relational degrees of freedom I understand is this. In contingency fields, heterogeneous relations continually expand possibility space through collaboration. At the same time, they intrinsically ensure the accuracy, necessity, and effectiveness of generation. Every encounter produces new uncertainty, new difference, new collaborative invitation. Freedom degree rises in open cycles and opens toward the other, rather than collapsing, homogenizing, or fragmenting.

Moreover, the concept of intelligence draws deep inspiration from James Bridle's planetary intelligence and planetary thinking proposed in *Ways of Being: Animals, Plants, Machines: The Search for a Planetary Intelligence*. Bridle's core framework aims to completely transcend anthropocentric intelligence paradigms. It re-understands intelligence as a distributed, relational, cross-species ecological process —a more-than-human way of being. It emphasizes that humans, technology, and non-human world (animals, plants, machines, ecosystems) co-emerge symbiotically through continuous interaction in uncertainty and interdependence.

Bridle sharply points out that current discussions of artificial intelligence often remain at the level of imitating or enhancing human cognition. This is essentially

a narrow continuation of anthropocentrism. He argues that planetary intelligence is a broader, ecological way of being.It is a generative process metaphorized as efflorescence. It naturally unfolds, expands, and adapts in relational networks of local interaction and overall coordination. The distributed nervous system of octopuses: The brain of octopuses distributes across the entire body, especially tentacles. In highly contingent underwater environments, tentacles autonomously sense and locally adjust in real time. The head only coordinates overall. This decentralized structure generates decisions through local collaboration among tentacles, rather than preset planning. Typical behaviors such as opening bottle caps, using coconut shells as tools, or instantaneous skin camouflage all emerge and correct gradually through direct interaction between tentacles and environment. Within a single body unit, it carries uncertainty and realizes behavioral expansion and flexibility.

The waggle dance consensus of bee swarms: Scout bees independently assess nest sites. They return and vote through dance intensity and duration. Consensus emerges at the group level. This highly decentralized, leaderless mechanism carries divergence through open local signal exchange in resource-scarce or environmentally fluctuating uncertain conditions. It generates collective adaptive strategies while ensuring overall accuracy. Bridle sees it as a model of planetary intelligence. It shows how group intelligence achieves emergence through relational interaction without central control. This resonates highly with my emphasis on collaborative freedom: local interaction provides degrees of freedom. Overall coordination ensures effectiveness and generativity.

The mycorrhizal networks of forests (Wood Wide Web): Mother trees identify seedlings through fungal networks. They prioritize resource delivery. They warn neighboring trees during pest attacks. They even transmit last nutrients when dying. This highly relational collaboration carries fluctuation through open local signal exchange in uncertain conditions like drought or pests. It generates new survival strategies (resource sharing, warning propagation). It significantly improves overall forest resilience. All these cases in writing point to one decentralized local collaboration pattern. In uncertain environments (predator threats, nest site conflicts, ecological fluctuations), they carry deviation and generate new adaptive strategies through continuous open signal exchange and relational modulation, rather than resorting to external rupture or massive defense. Intelligence emerges

at the intersection of distributed structures. Local interaction provides degrees of freedom and possibility space to carry uncertainty. Overall coordination ensures effectiveness and generativity.

Deeply inspired by Bridle's planetary intelligence framework, I further refine this relational interactive capacity as collaborative degrees of freedom. It is not Bridle's original term. It is my response to and extension of these cases. In highly contingent fields, heterogeneous relations continually expand possibility space through sustained collaboration. At the same time, they intrinsically ensure accuracy, necessity, and effectiveness of generation. This understanding rejects uncertainty as noise to suppress. It treats it as collaborative invitation. It shifts intelligence from closed optimization to open co-creative field.

As I mentioned in the introduction, my exploration of collaborative freedom in uncertain environments aims, on one hand, to clearly distinguish from the individuation logic proposed by Yuk Hui in *Recursivity and Contingency*. I highly recognize his profound contribution in establishing contingency as recursive necessity material for individuation. It powerfully embeds contingency in the core of techno-existential processes. It drives resistance to cybernetic unity (Hui, 2019a). We can think this way. In Graham Harman's object-oriented ontology (OOO) logic, the absolute inaccessibility of the thing-in-itself is reactivated and affirmed. It is precisely this radical unknowability gesture that inspires Ian Bogost's alien phenomenology as a response. We indeed cannot truly know what the other experiences. Any attempt to approach inevitably carries our own existential framework. Yet as Bogost suggests, we can still try to operationally describe, simulate, or infer those heterogeneous ways of being without pretending complete penetration.

Here, Yuk Hui's position indeed offers a more constructive path. We truly cannot know what we cannot know. On the contrary, it can become the starting point of plural cosmotechnics—acknowledge incommensurability between different cultural, techno-existential modes, yet still achieve effective coexistence and collaboration in concrete technical practices.

However, in handling the dimension of the necessity of contingency itself (how contingency intrinsically becomes part of necessary structure, not merely external material), I believe his framework still has space for further unfolding and operationalization. Although Hui constructs a unique plural cosmotechnics

perspective through multi-angle observation and mutual embedded grafting of different theoretical traditions—this has important theoretical value and inspiration as the style of a mature scholar—such method sometimes tends to present contingency as a relatively external rupture. This leads to reliance on large-scale diversity and recursive loops to cope with unforeseeable uncertainty. I do not wish the appearance of contingency to be mainly understood as an absolutely inconceivable external invasion. It forces individuals or systems to passively adapt only through expanding massive enumeration or recursive depth. This path, though productive, may appear relatively indirect and resource-intensive at the operational level. Therefore, my approach turns to another direction: explore how a single generative structure intrinsically possesses sufficient degrees of freedom and carrying capacity to handle uncertainty. This actually requires deeper examination of specific collaboration mechanisms and the elasticity and adaptability of structure itself—thus shifting contingency from external resistance to intrinsic generative invitation. It realizes more direct co-creation and ascent in relational degrees of freedom.

I cite the invention case of modern Chinese typewriters to illustrate one point. When Chinese traditional natural-technical thought encountered European science and mechanical rationality, it faced a near-alien civilization other. The combination of the vast number of Chinese characters with mechanical devices is essentially a highly intelligent coordination method. It does not pursue complete metaphysical equivalence or thorough understanding between both sides. Through creative mediating mechanisms, it reasonably organizes non-understanding itself and produces actually effective collaboration.

Lin Yutang's MingKwai typewriter invention does not try to directly translate or present the etymological essence of Chinese characters (such as six principles, pictographic roots) to Western mechanical logic. It invents a completely new retrieval method: through component combination and shape-code input, it summons massive characters on limited keys. This retrieval system is originally unfamiliar to most Chinese. It is neither direct extension of traditional writing habits nor simple transplant of Western alphabetic systems. It is a third path: a technical spacing device. It acknowledges cultural-cognitive gaps. Through operational invention, it realizes effective resonance between humans and machines, Eastern writing and Western mechanics. That is, in plural heterogeneous techno-existential environments, the mode of incomplete understanding yet effective collaboration. It

takes collaborative degrees of freedom as the core evaluation criterion. This mode not try to pursuit of metaphysical unity or complete transparency. It relies on concrete, local, co-creative technical mediation. It transforms difference itself into productive force—this essentially requires intelligence to practice in complex uncertainty with diversity and effectiveness of collaboration as standards.

We may understand Lin Yutang's MingKwai typewriter invention as a concrete planetary intelligence practice. As James Bridle discusses, planetary intelligence is not some higher unified computation. It is a distributed, relational way of being. It realizes resonance and symbiosis through incompletely transparent mediation between humans and non-humans, different cognitive traditions and technical systems (Bridle, 2022). The MingKwai typewriter precisely does not try to erase the gap between the etymological essence of Chinese characters and Western mechanical logic. It invents a new spacing device. It lets heterogeneous cultural-technical existences effectively interact at the operational level. This effective collaboration is one core feature of planetary intelligence. It transforms difference itself into generative force rather than trying to include it in a singular control or transparent framework. In this sense, Lin Yutang's invention is not just a spectacle in technical history. It foreshadows a broader, planetary-scale intelligent practice: acknowledge plural existence, rely on local co-creation, let machines become connectors.

We can also draw on the analytical framework of Chapter 2 to scrutinize contemporary generative models. This scrutiny discloses their profound divergence from planetary intelligence. Generative models—including the Diffusion family, GAN lineage, and Transformer-based LLMs—typically exhibit marked conservative tendencies in their default training and inference regimes. This inclination is not incidental. It flows directly from the inherent logic of their core optimization objectives and architectural design.

In Diffusion models, the forward process progressively injects Gaussian noise, driving real samples toward a pure noise distribution. The reverse denoising network learns to reconstruct samples incrementally from noise. Its training objective centers on maximizing denoising likelihood. Consequently, during inference, the model strongly favors the shortest, highest-probability trajectory along the data manifold. When inputs display semantic deviation or occupy distribution boundaries, the model tends to rapidly retract signals toward high-density regions of the training distribution. This contraction compresses the manifold boundaries, yielding outputs

that are markedly homogenized. GAN models approximate the data distribution through adversarial interplay between generator and discriminator. Yet the intrinsic risk of mode collapse, combined with the discriminator's dominance over gradient signals, frequently causes the generator to converge on a narrow set of high-confidence modes. It relinquishes adequate coverage of the full distribution diversity. Confronted with unknown or edge inputs, the generator privileges safe, repetitive statistical paths over active exploration of open possibility spaces.

Transformer-based LLMs rely on autoregressive next-token prediction. Their attention mechanisms and large-scale pre-training render them profoundly reliant on statistical regularities within context. Low-temperature sampling or greedy-like decoding further amplifies the influence of high-probability tokens. When semantic boundaries or rare combinations arise, the model gravitates toward the highest-frequency continuation path in the training data. Outputs thus rapidly collapse into homogenized expressions. The essence of this conservative inclination lies in the reinforcement of automaticity. The model construes uncertainty as noise to be suppressed rather than as a potential collaborative invitation. It forsakes relational degrees of freedom and open interactive possibility space. At this juncture, intelligence confines itself to the repetitive reproduction of statistical continuity. This stands in stark contrast with the dynamic process foregrounded by planetary intelligence: emergence through relational resonance and generative efflorescence amid uncertainty.

Mainstream models do indeed suppress uncertainty. Yet frontier research is hastening the transformation of uncertainty from something to be suppressed to an occasion for collaboration. This shift expands relational degrees of freedom and generative possibility space.

In the domain of uncertainty quantification, human-AI joint frameworks are emerging. Recent contributions formalize collaborative uncertainty quantification, achieving complementarity and decision robustness through shared construction of prediction sets. Other work explores capability-oriented guidance, employing uncertainty to aid users in navigating model limitations and thereby enhancing collaboration efficiency.

Multi-agent systems underscore coordination and exploration among LLM-driven agents in uncertain environments. Workshops dedicated to multi-agent learning in the generative era illuminate opportunities for collaboration across

agents. Approaches that estimate black-box uncertainty through diverse interactions convert it into multi-perspective collaboration signals(*Workshop on Multi-Agent Learning and Its Opportunities in the Era of Generative AI* 2026). Norms of human-AI interaction are shifting toward dynamic patterns. Reviews in the field critique simplistic collaboration paradigms and advocate for more interactive design. Studies on privacy in human-AI relationships and agent-supported scientific co-creation demonstrate how uncertainty-aware variant paths foster trust mechanisms and co-creative processes(Shao, Y. Wang, Qian, et al., 2025).

These developments indicate that uncertainty is gradually transmuting into collaborative invitations that foster the expansion of relational degrees of freedom. They presage AI's potential transition from closed optimization to an open co-creative paradigm. Although noise-centric explorations in specific domains treat noise as a core generative driver, they have not yet displaced mainstream generative AI, which remains governed by likelihood optimization. Should future advances elevate noise to the central objective function for generative invitation, this paradigm inversion may gain swift momentum(*IEEE SSCS GRAND Lectures* 2025–2026).

Theoretical and Practical Implications

Theoretically, this framework injects structural breathing into digital humanism. It provides a shift in thinking about technological sovereignty—from "stack possession" to "open co-creation."

Main Findings and Contributions Summary

The contributions of this research condense into four mutually echoing claims. They collectively support and illuminate the core insight of "collaborative freedom."

First, it reconstructs "xiang" as a resonant structural configuration. It deeply fuses with Rombach's structural ontology. This proposes an intrinsic, relational generative dynamic system. This path successfully transforms contingency from external uncontrollable rupture into active tension and ascent momentum inside structure. It lays the ontological foundation for collaborative freedom (Rombach, 1971).

Second, it extracts "structural rhythm of creativity"—difference recognition → tension modulation → structural transduction—as a precise tool to diagnose creativity in generative AI. This rhythm reveals that contemporary models excel at manifold-preserving improvisation (disguising novelty with statistical continuity). Yet under boundary pressure, they show profound conservative tendencies. True rare manifold-transforming individuation (structural transduction and intrinsic blooming of contingency) depends on external structural intervention. This brings a fundamental shift in the concept of creativity—from "output novelty" to "ascent in structural events."

Third, on the subjectivity axis, it re-understands subject as "occupation of structural position nodes." This is a thoroughly non-anthropomorphic positional capacity. It maintains generative nodes in relational loops. It thereby reorganizes regimes of visibility, sayability, and responsiveness. This understanding both structuralizes James Bridle's planetary being and critically traverses Heidegger's essentialist enclosure of technology in "enframing" (Gestell) (Bridle, 2022).

Research Limitations

This research strives for rigor. Yet it has clear boundaries. It focuses on specific model families and a small number of artistic systems. It does not fully address data politics, global division of labor, energy footprint, or infrastructure issues. Some concepts in the structural creativity framework remain abstract. They are difficult to fully quantify and verify. The practice deliberately constructs extreme boundary conditions. It is therefore not a universal claim about all AI. It is phenomenological observation under specific tensions.

These boundaries simultaneously open broader futures.

Future Research Directions and Closing Remarks

Future work can extend the resonant framework to sound, movement, embodied interaction, and social systems. It can deepen user experience and cross-cultural comparison. It can examine how different cultures interpret, resist, or reconstruct AI inscription and entanglement. It can place "xiang" in dialogue with other non-

Western technical philosophies and infrastructure critiques. At the same time, it must guard the core of structural readability and intervention.

A picture has already emerged. Humans always dwell in the tension gap between natural mechanisms and artificial constructions. In this gap, they continually reproduce themselves. In the symphony of Hui's cosmotechnics and Bridle's planetary intelligence, this thesis starts from the resonant field of "xiang." It takes collaborative freedom as the essence of intelligence. It proposes a path of structural co-creation: let difference become resonance, let contingency become ascent, let technology become a generative field that interconnects with all things again (Hui, 2019b).

Creativity is never an appendage of technology. It is the intrinsic breathing of the relational field unfolding itself. We—humans, machines, images, contingency—are breathing together in this same uncertain resonance. Here, the inquiry into intelligence is no longer about conquering the unknown. It is about inviting the unknown to ascend together.

When all is said and done

I am reminded of Liu Cixin's short story *Ode to Joy*. The narrative unfolds during the final summit of the GA (Global Association), an organisation initially created to foster global peace but later compromised by national self-interest and political erosion. As the GA lost its capacity to ensure equity, its final assembly was held as a farewell concert. On a vast lawn, people gathered to witness its closing.

Suddenly, a strange celestial object appeared in the sky—at first mistaken for the moon, but growing larger until someone exclaimed, "Look! Isn't that North America?"A second Earth was approaching. It defied physical laws, producing no gravitational pull. Astronauts discovered it to be a perfect mirror: millions of kilometres in diameter, zero thickness, perfectly reflecting all light. Then, the mirror vibrated—it began to emit sound. It was not a planet, but a musician from an advanced civilisation, performing a cosmic symphony using solar energy.

As the audience listened, the mirror rendered the birth of planets, the rise of life, war, civilisation, machines, intelligence, and the world yet to come. After the performance, Earth's leaders asked the mirror to transmit a human song into the cosmos. Some proposed Beethoven's *Symphony No. 5* ("Fate"), but others argued

for *Ode to Joy*, a song affirming life's beauty despite the inevitability of death. Together, the people sang.

The mirror reflected the song to the sun. The sun amplified it into the universe:

> Five hours later, the song will leave the solar system.
> Four years later, it will reach Sagittarius.
> In 100,000 years, it will echo across the Milky Way.
> In over 200,000 years, it will reach the Magellanic Clouds.
> In 6 million years, it will pass through 40 star systems of our Local Group.
> In 100 million years, it will spread across 50 galaxy clusters.
> In 15 billion years, it will reach the known universe—and continue outward,
> If the universe is still expanding by then.

This was not a story of an end, but a self-portrait of dignity, art, and civilisation. In humanity's moment of silence, *Ode to Joy* became our only structural language. Whether or not it is ever answered, the song continues to traverse the universe's dark, singing and shining. And perhaps, even now, human civilisation is creating that mirror—called AI.

Chapter 4

appendixpage

4.1 Formal Definition of Creativity System

To explain the proposed notion of creativity, we define a system of creativity as a temporal sequence:

$$\{\mathcal{M}_t\}_{t=0}^{\infty} = \{(P_t, O_t, G_t, I_t)\}$$

Each system $\mathcal{M}_t$ at time t consists of:

- P_t: the set of **pieces** available at time t
- O_t: the set of **operations** applicable at time t
- $G_t = \{g_t \mid g_t : P_t \to O_t\}$: the set of possible **system states** g_t, where each piece $p^{(i)} \in P_t$ is assigned an operation $o^i \in O_t$
- $I_t : G_t \to \{0, 1\}$: a **creativity evaluation function**, determining whether a configuration is considered creative

In this system, we could view it as an individuation procedure for a specific subject(or agent) who:

- perceives difference —a deviation or tension that disrupts the current state
- triggers a system transition:

$$\mathcal{M}_{t+1} \neq \mathcal{M}_t \quad \text{only if a difference is perceived}$$

- constructs a new configuration $g_{t+1} : P_{t+1} \to O_{t+1}$
- evaluates g_{t+1} via I_{t+1} and updates the system accordingly

4.1.0.0.1 Fundamental Elements In this formulation, the elements P_t, O_t, and s_t are considered the *foundational components* of the system. The system state space G_t and the evaluation function I_t are *determined* by these three elements: G_t is derived from all possible assignments of operations to pieces, while I_t encodes how the agent s_t interprets and evaluates those configurations. This structure reflects the idea that creative potential emerges from the interplay of available material (P_t), techniques or tools (O_t), and the agency or perspective (s_t) acting on them.

4.1.0.0.2 Evolution Rule: Transition from $\mathcal{M}_t$ to $\mathcal{M}_{t+1}$ The system evolves over time through the agent's behavior. The transition satisfies:

$$\mathcal{M}_{t+1} \neq \mathcal{M}_t \iff P_{t+1} \neq P_t \text{ or } O_{t+1} \neq O_t$$

In general, this allows for expansion, reduction, and reconfiguration, guided by the agent's perception of meaningful difference.

4.1.0.0.3 A Special Case: Cumulative Expansion and Local Novelty A restricted form of the model assumes cumulative growth:

$$P_{t+1} = P_t \cup P^c_{t+1}, \quad O_{t+1} = O_t \cup O^c_{t+1}$$

$$\text{with } P^c_{t+1} \neq \{\} \quad \text{or} \quad O^c_{t+1} \neq \{\}$$

The evaluation function in this case is based on local novelty:

$$I_{t+1}(g_{t+1}) = \begin{cases} 1 & \text{if } \exists p \in P^c_{t+1} \text{ or } g_{t+1}(p) \in O^c_{t+1} \\ 0 & \text{otherwise} \end{cases}$$

This model of creativity is the use of new components —either a new piece or a new operation —capturing exploratory and incremental innovation.

4.1.0.0.4 Philosophical Interpretations: Simondon and Rombach The evaluation function $I_t(o(p))$ may reflect different theories of difference:

- **Simondon**: Difference originates from *external contingencies*. The agent responds to disruptions from the environment. Creativity is a process of *individuation*, and I_t values emergence and novelty. His point is between world M_t and M_{t+1}, operators O and materials P could stay the same while evaluation function I must change; this is a different discription from us.

- **Rombach**: Difference arises from *internal structural tensions*. Creativity is an imminent reconfiguration of the system. I_t favors outcomes that restore or transform systemic coherence. In the Rombachian view, the creative agent s_t is not external to the system, but embedded within it. The evaluation function I_t is thus not imposed by the agent from outside, but emerges structurally from the configuration g_t in relation to s_t. That is, I_t may be interpreted as a function of both g_t and s_t:

  $$I_t = I(g_t, s_t)$$

  This reflects Rombach's structural ontology, in which creativity is not a matter of subjective novelty, but of systemic coherence and necessary internal transformation—evaluated from within the evolving structure itself.

Thus, I_t can encode either:

- Sensitivity to **external novelty** (Simondon)

- Sensitivity to **internal structural necessity** (Rombach)

Both perspectives can be incorporated into the model, offering alternative logics for recognizing and evaluating creativity.

- agents s are fundamental for both.

- a priori stability conditions : $O, P \to G$

- deterministic experiential structure: I

4.2 A Three-Stage Model of Creative Individuation

In our view, creativity is not a spontaneous reaction to novelty, but the system's ability to recognize, respond to, and reorganize structural difference. To explain this process, we build on the idea of a generative system that evolves, consisting of available materials, operative rules, a current configuration, and a way to evaluate the meaningfulness of its outputs. This system is guided by an internal agent or subject, who plays a central role in perceiving and shaping creative transitions. We defined three interrelated stages that characterize how creativity unfolds as a form of individuation:

4.2.1 Stage I: Difference Recognition

The creative process begins when the subject s_t perceives a **difference**—a deviation or tension—in the current system state $g_t \in G_t$. This occurs when certain materials ($p \in P_t$) cannot be effectively organized using the available operations ($o \in O_t$). Rather than dismissing this as an error, the subject recognizes it as a *structural limit*, indicating the current configuration's insufficiency.

This recognition shifts the system from stability into tension, formally expressed as:

$$\mathcal{M}_{t+1} \neq \mathcal{M}_t \quad \text{if and only if a difference is perceived}$$

This stage highlights the agent's perceptual sensitivity to structural boundaries.

4.2.2 Stage II: Tension Modulation

After recognizing structural differences, the subject s_t enters a stage of **tension modulation**, which involves integrating the identified difference within a new configuration $g_{t+1} : P_t \to O_t$.

Instead of eliminating the conflict, the difference is preserved as structural or stylistic tension, maintaining overall coherence. The agent s_t thus acts as a structural mediator, creatively reorganizing relationships within the existing elements (P_t, O_t), without necessarily altering these sets.

4.2.3 Stage III: Structural Transduction

When tension can no longer be accommodated within the existing materials (P_t) or operations (O_t), the system reaches structural breakdown, triggering **structural transduction**.

At this stage, the subject introduces new materials (P^c_{t+1}) or new operations (O^c_{t+1}):

$$P_{t+1} = P_t \cup P^c_{t+1}, \quad O_{t+1} = O_t \cup O^c_{t+1}$$

This structural expansion transforms the generative space (G_{t+1}), establishing fundamentally new organizational possibilities. Structural transduction thus represents a profound shift in the system's underlying logic, categories, or perceptual frameworks.

4.2.4 Summary: Creativity as Structural Response

Summarizing our model, creativity involves:

1. **Difference Recognition**: Agent s_t perceives tensions.
2. **Tension Modulation**: Agent reorganizes internally, maintaining coherence.
3. **Structural Transduction**: Agent introduces new elements, transforming the structure itself.

Each stage builds upon the previous, forming a dynamic sequence of creative individuation. This model views creativity as an agent-driven structural response to difference, applicable to both human and artificial generative systems.

4.3 Evaluating the Structural Creativity of Current Generative Models

4.3.1 Example: Evaluating a Diffusion Model within the Proposed Framework

To demonstrate the application of the proposed structural creativity framework, we explicitly formalize a diffusion model as a temporally evolving creative system:

$$\mathcal{M}_t = (P_t, O_t, G_t, I_t, s_t).$$

In the context of diffusion models, the foundational components at any time t can be defined clearly:

- **Materials** (P_t): These include the initial noise vector, intermediate latent states, and any conditional embeddings that guide the generation: $P_t = \{\text{initial noise vector}, \text{latent states}, \text{conditioning embeddings}\}$.
- **Operations** (O_t): These consist of the denoising operations performed by the neural network, the noise scheduling algorithms that control the inference process, and auxiliary transformations like normalization or resampling:

$$O_t = \{\text{denoising network}, \text{noise scheduling}, \text{auxiliary transformations}\}.$$

- **Generative State Space** (G_t): The possible configurations are determined by how specific operations transform each latent state or embedding:

$$G_t = \{g_t \mid g_t : P_t \to O_t\}.$$

- **Evaluation Function** (I_t): Diffusion models lack a real-time evaluative mechanism during inference. They strictly follow predefined generative steps without evaluating intermediate outputs dynamically:

$$I_t = \text{None}.$$

- **Agent** (s_t): The agent is strictly procedural and static, executing predefined operations without perceiving differences, adapting strategies, or updating structural boundaries dynamically:

$$s_t = \text{Fixed procedural agent}.$$

Considering the three-stage individuation model described previously:

1. **Difference Recognition**: The agent does not perceive structural differences, as there is no evaluation of intermediate tensions or deviations from expected structures.

2. **Tension Modulation**: Since no differences are perceived, there is no modulation of tensions or creative reorganization within existing materials and operations.

3. **Structural Transduction**: No new materials or operations are introduced during inference. The generative system remains structurally static:

$$\mathcal{M}_{t+1} = \mathcal{M}_t.$$

Therefore, according to our framework, despite diffusion models' sophisticated generative abilities, they lack structural creativity. The absence of a responsive agent, evaluative mechanism, and structural evolution clearly indicates their limitation to pre-established generative procedures without genuine creative individuation.

4.3.2 Example: Evaluating a Generative Adversarial Network (GAN) within the Proposed Framework

To further demonstrate how the proposed structural creativity framework applies to generative models, we formalize a Generative Adversarial Network (GAN) explicitly as a temporally evolving creative system:

$$\mathcal{M}_t = (P_t, O_t, G_t, I_t, s_t).$$

Within the GAN context, we define its foundational components clearly:

- **Materials** (P_t): These comprise the initial noise vector and, in the case of conditional GANs, the conditioning vector: $P_t = \{\text{noise vector}, \text{conditioning vector (conditional}$

- **Operations** (O_t): These include the generator network's generative operations and the discriminator network's discriminative operations:

$$O_t = \{\text{generative operations}, \text{discriminative operations}\}.$$

- **Generative State Space** (G_t): The possible generative configurations defined by mappings from input materials (noise and conditional vectors) through the generator operations:

$$G_t = \{g_t \mid g_t : P_t \to O_t\}.$$

- **Evaluation Function** (I_t): During training, this function is actively represented by the discriminator, which assesses generated outputs against real data:

$$I_t(g_t) = \text{discriminator confidence.}$$

However, during inference (generation), this evaluative function is no longer operative:

$$I_t = \text{None during inference.}$$

- **Agent** (s_t): During training, the agent dynamically adjusts parameters through adversarial learning. During inference, however, it becomes a static executor of predetermined operations:

$$s_t = \begin{cases} \text{adaptive agent (during training),} \\ \text{fixed procedural agent (during inference).} \end{cases}$$

Considering the three-stage individuation model previously established:

1. **Difference Recognition**: During training, the GAN agent recognizes differences between generated samples and real data through discriminator feedback. During inference, no such recognition occurs, as the discriminator's evaluative feedback is inactive.

2. **Tension Modulation**: Tensions identified during training are modulated by adjusting parameters through adversarial competition. In inference, the agent ceases modulation as no new differences are perceived or addressed.

3. **Structural Transduction**: GANs do not introduce new materials or operations during inference, hence no structural evolution occurs post-training:

$$\mathcal{M}_{t+1} = \mathcal{M}_t.$$

Thus, within our framework, GANs demonstrate adaptive dynamics and structural evolution during training, but their creative individuation ceases during inference. Consequently, GANs' generative capacity during inference remains confined within the pre-established boundaries defined during training, indicating no structural creativity according to our criteria.

4.3.3 Example: Variational Autoencoder (VAE) within the Proposed Framework

To illustrate the applicability of our structural creativity framework further, we explicitly formalize a Variational Autoencoder (VAE) as a temporally evolving creative system:

$$\mathcal{M}_t = (P_t, O_t, G_t, I_t, s_t).$$

Within the VAE context, the foundational components can be clearly identified:

- **Materials** (P_t): These include the latent noise vector sampled from a Gaussian distribution and the latent distribution parameters (mean and variance) produced by the encoder: $P_t = \{\text{latent noise vector}, \text{mean and variance parameters}\}$.
- **Operations** (O_t): These comprise the encoder operations (mapping input data to latent parameters), the decoder operations (mapping latent vectors to reconstructed outputs), and a null operation representing no additional transformations:

$$O_t = \{\text{encoding operations}, \text{decoding operations}, \text{null operation}\}.$$

- **Generative State Space** (G_t): Defined as all possible configurations resulting from applying decoding operations to latent representations:

$$G_t = \{g_t \mid g_t : P_t \to O_t\}.$$

- **Evaluation Function** (I_t): During training, the evaluation function combines reconstruction error and KL divergence, guiding parameter optimization:

$$I_t(g_t) = E\big[\|\text{input} - \text{output}\|^2\big] + \text{KL}\big(q(z|x) \,\|\, p(z)\big).$$

During inference (generation), however, this evaluation is inactive:

$$I_t = \text{None during inference.}$$

- **Agent** (s_t): The training agent dynamically adjusts parameters based on the evaluation function to minimize reconstruction error and KL divergence. During inference, the agent executes predefined decoding operations:

$$s_t = \begin{cases} \text{adaptive agent (during training)}, \\ \text{fixed procedural agent (during inference)}. \end{cases}$$

Considering our three-stage individuation model:

1. **Difference Recognition**: During training, differences (errors in reconstruction and latent distribution divergence) are actively recognized and evaluated. During inference, no active evaluation or perception of difference occurs.

2. **Tension Modulation**: Training involves adjusting parameters to modulate identified tensions. During inference, tension modulation ceases, as no further differences are perceived or addressed.

3. **Structural Transduction**: VAEs do not introduce new materials or operations during inference, meaning no structural evolution occurs after training:
$$\mathcal{M}_{t+1} = \mathcal{M}_t.$$

Thus, according to the proposed creativity framework, while VAEs demonstrate adaptive behavior during training, they lack structural creativity during inference. Their generative capability is fully contained within the fixed boundaries established during training, indicating no creative individuation as defined by our criteria.

4.3.4 Evaluation Results

View these above generative models in our framework, and it is noticed that the generative procedure, as well as the output(generative) above, are all a matching between countable(finite) pieces and countable operations. This could be viewed as searching in a finite generative space. But the agent(human) and its related I innovation decide whether the generation result is creative or not. Besides, they all lack an evolving capacity on M, which limits their potential to **infinite creativity**.

Crucially, none of these systems—Diffusion Models, GANs, or VAEs—exhibit any genuine **evolutionary capacity** over the system $\mathcal{M}_t$. Once trained, their material set P, operation set O, and evaluation logic I remain static. This absence of structural development fundamentally limits their potential for what we call **infinite creativity**—a creativity not confined to recombination, but driven by systemic reconfiguration.

These observations clarify why, despite their ability to produce highly diverse and seemingly novel outputs, such models remain bound by internal limits. They

operate through predefined operations, closed material sets, and fixed evaluative logics. At most, they simulate a form of *difference recognition*, but this recognition is never operationalized into structural change. The logic of the system remains intact throughout inference:

$$\mathcal{M}_{t+1} = \mathcal{M}_t.$$

Hence, we are led to a philosophical conclusion: the "creativity"of today's generative systems is not the result of structural invention, but rather a kind of **complexity simulation**—an emergent richness produced within static architectures. To foster genuinely creative systems, one must look beyond output diversity and toward **architectural plasticity**—that is, the ability to perceive difference as structural tension, to modulate internal heterogeneity, and to enact structural transduction when organizational thresholds are reached.

Each model offers a different illustration of this limitation:

- **Diffusion Models** proceed through rigidly defined generative steps without any evaluative capacity during inference. The agent is fixed, and the generative space remains fully predetermined.

- **VAEs** show adaptive behavior during training but revert to a static, inference-only regime post-optimization. Their latent space is expressive, yet structurally closed.

- **GANs**, in contrast, present a subtle yet significant possibility. During training, the adversarial feedback loop allows for limited difference recognition and tension modulation. Though inference remains fixed, the *training-phase dynamics* hint at a direction for future evolution: if GANs could be extended to perform continual adversarial learning or integrate self-modifying architectures even post-training, they might begin to approximate structural individuation.

In all cases, what appears as generativity is, upon closer inspection, a constrained traversal through a latent manifold—one that is *bounded, static, and closed*. None of these models satisfy the three key criteria we outlined earlier: recognizing difference as tension, modulating internal structure accordingly, and transducing breakdowns into new generative grammars.

Thus, what passes for creativity in current generative AI is more accurately described as a **simulacrum**—a surface mimicry of invention grounded not in structural transformation but in combinatorial rearrangement. To move beyond this simulacrum, future systems must cease to be mere output machines and instead become *structural agents*—systems capable of reconfiguring their creative condition in response to what they cannot yet generate.

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