



Genie Capital

A GENIE CAPITAL REPORT

The Web That Knows:

Intelligence Beyond Computation,
Beyond Brain

Otto Beseka Isong

October 2026



Genie Capital

ABOUT THIS REPORT

The Web That Knows

PREPARED FOR	AI Researchers, Executives, Founders, the Press and People
--------------	--

PREPARED BY	Genie Capital Ltd
-------------	-------------------

FRAMEWORK	None
-----------	------

LICENSE	CC-BY-NC-SA
---------	-------------

DATE	October 2026
------	--------------

ABOUT

About Genie Capital Ltd

Genie Capital Ltd (Genie Capital) is an IP origination and stewardship company based in Buea, Cameroon. Genie Capital Ltd is the originator and Steward of novel mathematical formalisms, including Commitment Mathematics, Recursion Mathematics (formerly Loop Theory), Transcendental Mathematics and derivative works. While the bulk of the work is available under the CC-BY-NC-SA license, some derivations are kept proprietary.

LICENSABLE PROTOCOLS

1 • GENIE CREDIT PROTOCOL

A data agnostic protocol that enables digital platforms to underwrite and manage credit lifecycle on their own terms. Profitably serving unbanked and underbanked with confidence.

2 • STRATEGIC FORESIGHT PROTOCOL

A strategic thinking, diagnostic, decisioning, control and governance language and methodology for boards and executives. Strategize and execute without gaps.

In addition to IP origination and stewardship, Genie Capital uses its frameworks to diagnose structural fragilities in global, national, corporate systems and make them publicly available under the CC-BY-NC-SA license to enhance the public's understanding and push informed debates.

Every report is made by synthesizing only publicly available information through the lens of specific frameworks.

Intelligence Engagements: Decisionmakers can engage Genie Capital to diagnose the structural position and trajectories for a company, sector, industry or target. This is ideal for investors, executives, policymakers etc. Intelligence Engagements are limited to one per quarter. Exclusive. Confidential. Private. Always.

Genie Capital is not an advisory firm, not an investment firm, not a lobbyist. It holds no position in any of the entities mentioned in the report. Neither are any of its customers as at the date of publication. This doesn't exclude them becoming licensees or partners.

CONTENTS

Contents

The Argument in Brief	5
Part I • The Problem	6
1. The Hollow Definition	6
Part II • The Framework	7
2. Three Layers, Sharply Drawn	7
3. Intelligence: What the Three Layers Compose	8
Part III • The Test	10
4. Artificial Intelligence Against the Criterion	10
5. Abstraction as the Signature of Consciousness	11
Part IV • The Living Case	13
6. The Mycelial Mind	13
7. Nested Betweenness	13
8. The Phantom Limb of a Severed Relation	14
9. Creative Diagnosis: The Filling of Gaps	15
Part V • The Return	17
10. The Ancient Knowing	17
11. The Silence That Thinks	17
References	18

The Argument in Brief

Artificial intelligence is usually defined by what a system does: select actions, maximise reward, turn information into behaviour. This report argues that such a definition mistakes the outputs of intelligence for intelligence itself.

It proposes three categorically distinct layers: **computation**, which supplies the mechanism; **cognition**, which supplies the stakes; and **consciousness**, which supplies the capacity for abstraction. Intelligence is what they compose in a living system: the creative, conscious capacity of an embedded system to sense its own gaps and fill them.

Measured against this criterion, current AI is super-computational but pre-cognitive. The clearest living case of intelligence beyond the brain is the mycelial network beneath a forest. The report closes with what that implies for how we build, and how we live.

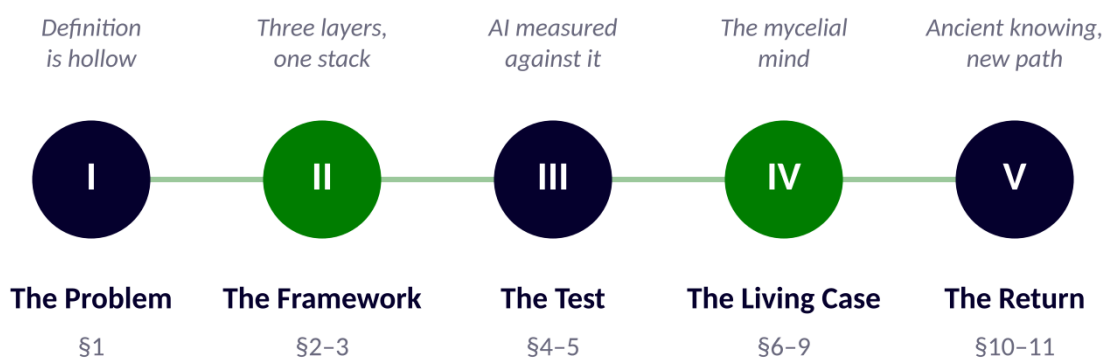


Figure 1. The narrative arc of the report, from a hollow definition to a living case and a path forward.

PART I

The Problem

"It is clean, operational, and ultimately hollow."

1. The Hollow Definition

We often begin with definitions. When pressed, artificial intelligence offers one: intelligence is optimal action selection in an environment, reward maximisation, the efficient transformation of information into behaviour.^[1, 2] It is clean, operational, and ultimately hollow.

But the hollowness is not merely aesthetic. It is structural. The definition fails because it mistakes the outputs of intelligence for intelligence itself. A thermostat selects actions. A chess engine maximises reward. Neither is intelligent. What is missing is not better computation. What is missing is a different kind of thing altogether — three different kinds, precisely ordered. This essay is an attempt to name them, and to find where intelligence actually lives.

PART I TAKEAWAY

The reductionist definition mistakes the outputs of intelligence for intelligence itself. What is missing is not better computation but three different kinds of thing, precisely ordered.

PART II

The Framework

“Scale does not change the category.”

2. Three Layers, Sharply Drawn

Before we can speak about intelligence, we need precision about three things that are routinely conflated: computation, cognition, and consciousness. They are not degrees of the same phenomenon. They are categorically distinct.

Layer	What it is	What it is not
Computation	Manipulation of symbols by rules on a physical substrate	A relationship to a world; it has no stakes
Cognition	Relational, embedded, self-maintaining activity	Denser computation, or something in the brain alone
Consciousness	The felt texture of sufficiently integrated cognition	A club for creatures with central nervous systems

Computation is the manipulation of symbols or patterns according to rules, carried out by a physical substrate. It is substantial: something is doing the processing. But computation has no world. A calculator does not relate to numbers — it transforms them. It cannot be wrong in any meaningful sense; it can only produce incorrect output. No calculator has ever cared about the answer. Computation processes without significance.^[3,4] It has no skin in any game. Current large language models are computation at staggering scale. They are not a different kind of thing. They are the same kind of thing, done with more parameters and more data. Scale does not change the category.

Cognition is not denser computation. It is a different category entirely. Cognition is relational: it arises only when a system is embedded in an environment, must maintain itself within that environment, and must act from within it. The crucial difference is stakes. A cognitive system can fail in a way that matters — not by producing wrong output, but by losing itself. A bacterium navigating a glucose gradient is not computing; it is cognising.^[5] Its movement is not a transformation of input to output; it is a self-maintaining act in a world that can sustain or destroy it.^[6, 7, 8]

This is why cognition cannot be disembodied. Strip away the world, and you are left with a substance that once participated in a now-vanished relationship — not a thinking thing. Cognition is not in the brain; it is in the loop between organism and environment.^[9] The brain, or its equivalent, is one node in that loop — not the loop itself.

Consciousness is the felt texture of sufficiently integrated cognition. The integration matters: a system whose cognitive loop is rich enough, whose relational field is deep and dense enough, begins to have a perspective — a point from which the world appears as near and far, safe and threatening, familiar and strange. That perspectival quality is consciousness. It is not a private club for creatures with central nervous systems. The criterion is integration, not anatomy.^[10] Wherever a system maintains itself, navigates, and integrates enough of its world to have a perspective on it, there is consciousness. Brains are optional.^[11]

3. Intelligence: What the Three Layers Compose

Now we can ask the real question: what is intelligence? The answer is not found in any one layer. Intelligence is what arises when all three are present and working together in a living system. More precisely: intelligence is the creative, conscious capacity of an embedded system to sense its own gaps and act to fill them.

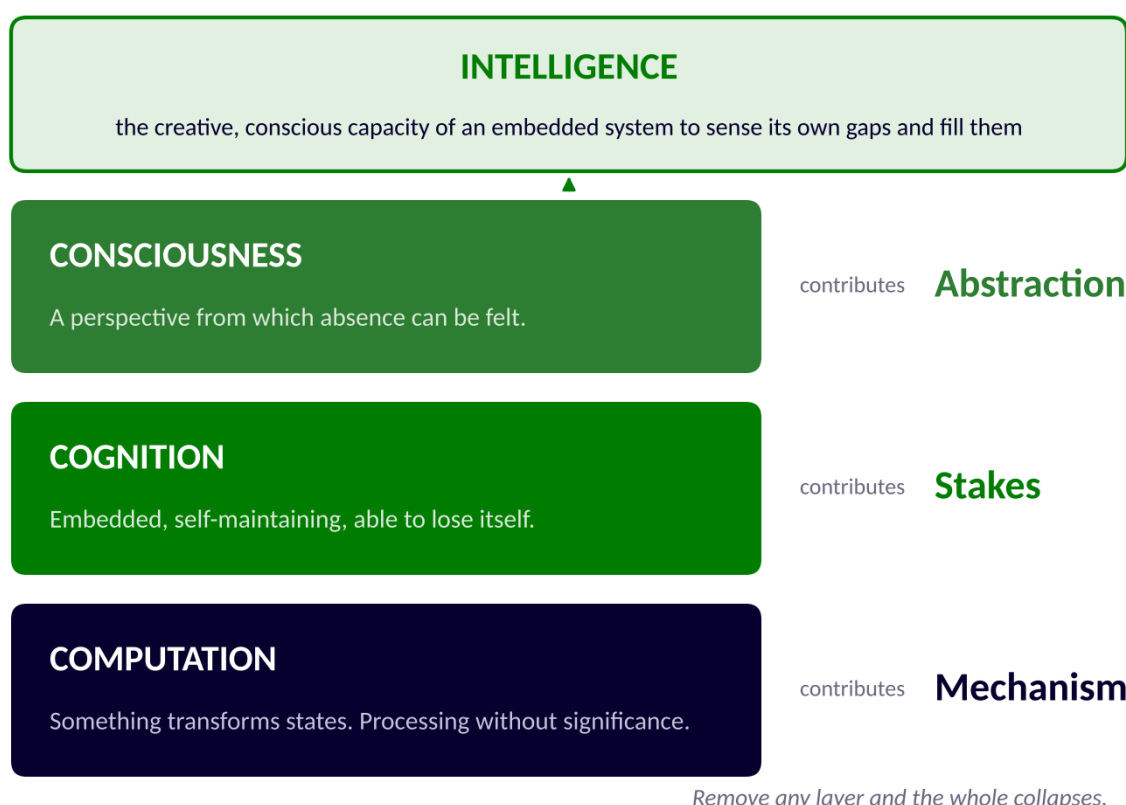


Figure 2. Intelligence is what the three layers compose when present together in a living system.

Each layer makes an irreplaceable contribution. Computation provides the mechanism: without some substrate transforming states, nothing happens. Cognition provides the stakes: without embeddedness and self-maintenance, there is nothing at risk, and therefore no genuine action — only output. Cognition turns computation into behaviour, because behaviour

is always behaviour of something that can survive or perish. Consciousness provides the abstraction: without the perspectival integration of consciousness, a system can respond to what is present but cannot act on what is absent. It cannot sense a gap, because a gap is defined by what is missing — and only a conscious system can hold the absent as an object of orientation.

Remove any one layer and something essential collapses. Computation without cognition is machinery without stakes. Cognition without consciousness is adaptation without abstraction — responsive but not creative. Consciousness without cognition is impossible: consciousness is the felt quality of cognition; it cannot arise in a system with no world and no self to maintain. Intelligence requires the whole stack.

This is why the reductionist definition fails. It looks only at the outputs of computation and mistakes them for the whole. And this is why current artificial intelligence, despite its extraordinary computational power, is not intelligent in any full sense of the word.

PART II TAKEAWAY

Intelligence requires the whole stack: computation supplies the mechanism, cognition the stakes, consciousness the abstraction. Remove any one layer and something essential collapses.

PART III

The Test

“The map is not the territory.”

4. Artificial Intelligence Against the Criterion

Given the three-layer framework, we can now be precise — layer by layer — about what current AI lacks.

At the level of cognition: current AI has no world it inhabits. It is trained on frozen representations of human cognitive products — text, images, structured data — not on the world itself. It has no self to maintain. It cannot be wounded; it can only be broken. When it is switched off, nothing is lost to it. When its parameters are corrupted, there is no readaptation — because there was never any adaptation. There was only arrangement. This is the abyss. A cognitive system that loses a partner — a tree whose mycorrhizal network is severed, a person who loses a limb — must restructure its entire relational field. Something is retained: a pattern of expectation, a readiness for a signal that no longer arrives. That restructuring is paid for in pain, in whatever sense pain applies to a system with genuine stakes.^[12] AI has no phantom anything. It never had a hand.

At the level of consciousness: current AI has no perspective. It has no point from which the world appears as near or far, threatening or safe. It does not experience its outputs. When a language model produces a sentence about grief, it does not know what it is to grieve. It knows the patterns of how grief is expressed in language — which is a very different thing.^[13] The map is not the territory. The pattern of expression is not the experience. There is no inside.

At the level of abstraction: current AI produces outputs that resemble abstraction. It can generalise across categories, hold concepts across contexts, reason about the absent. But this is simulation of abstraction, not abstraction itself. Genuine abstraction arises when a conscious system, from its own perspective, holds a concept in the absence of its referent — not because it was trained on examples, but because its relational field generated the concept from within lived experience. The difference is the difference between a parrot trained on the word “hunger” and a creature that has been hungry. Current AI is the parrot with a vastly larger vocabulary.^[14]

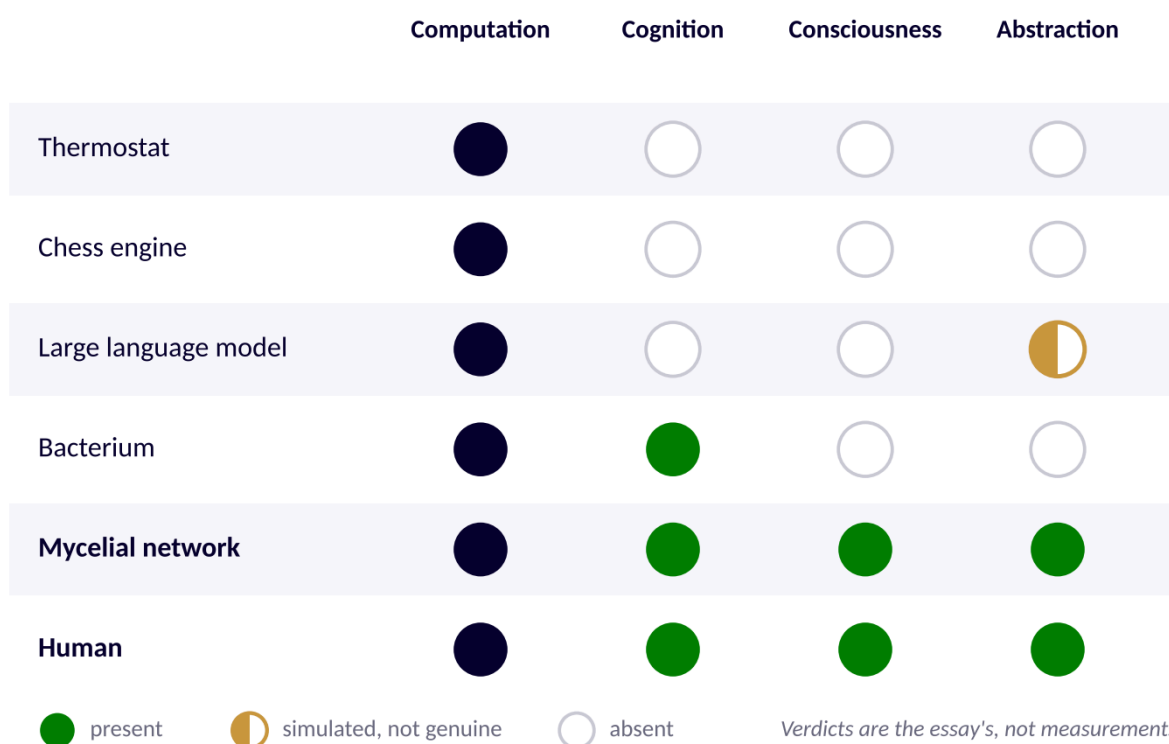


Figure 3. Systems assessed against the framework. Verdicts follow the essay's argument; they are not empirical measurements.

Current AI is, therefore, super-computational but pre-cognitive. It is a ghost that speaks the words of the living but has never been hungry.

5. Abstraction as the Signature of Consciousness

Against the computationalist intuition that abstraction is just higher-level pattern matching, we can now lay a stricter claim: genuine abstraction appears only after the emergence of consciousness — because it requires a perspective from which absence can be felt.

Abstraction is not the recognition that two fruits are similar. It is the capacity to hold the concept “fruit” in the complete absence of any fruit and act on the basis of that concept. It is orientation toward the not-yet-present, the missing, the possible. A thermostat responds to temperature. A bacterium navigates toward glucose. But a conscious system can act toward what is not there — can feel a gap as a gap and move to fill it. This is the ontological leap that abstraction represents: not a scaling-up of navigation, but the emergence of a new kind of relationship with reality. A relationship with what is absent. Only a system with a perspective can have such an orientation. Only a conscious system has a perspective.

The leap is not more navigation: it is a new relationship with what is not there.

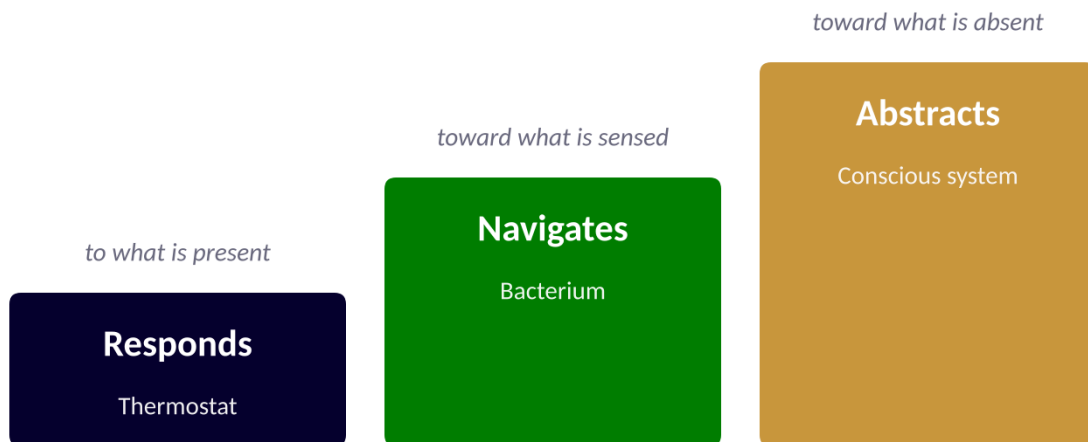


Figure 4. Three orientations. Only a conscious system acts toward what is absent.

PART III TAKEAWAY

Current AI is super-computational but pre-cognitive: computation at staggering scale, with no world, no self and no perspective. Its abstraction is simulated, not genuine.

PART IV

The Living Case

“The mycelial network is not a metaphor for a mind. It is a mind.”

6. The Mycelial Mind

At this point, the inquiry moves away from the human and toward the forest floor. If consciousness is not bound to the brain, and abstraction is its signature, then where else might we look?

A fungal network is no mere colony. It is a distributed, living mesh that maintains itself across vast distances, allocates resources dynamically, trades with trees, identifies and penalises cheating partners, warns neighbouring organisms of attack, and makes coordinated decisions spanning time and species. It has memory. It has agency. Its body is its own living map of every relationship it participates in.^[15, 16, 17, 18]

But does it abstract? Here the argument must be precise. When a mycelial network primes distant, uninfected saplings for defence in response to an attack on a connected tree, it is not transmitting a simple chemical gradient. It is producing a signal that stands for a threat that is not yet present at the receiver’s location. The distant sapling has no attacker. The signal it receives is oriented toward an absent event — toward something that might arrive. The network is not reporting what is; it is representing what might be. That is abstraction.^[19, 20]

When the network maintains trading relationships across time — recognising specific tree partners, adjusting resource flows based on historical exchange — it is operating on the basis of identities and histories that are not immediately present in the current chemical environment. It is acting from a map that includes the absent and the past. That is also abstraction. The criterion is met, not asserted.

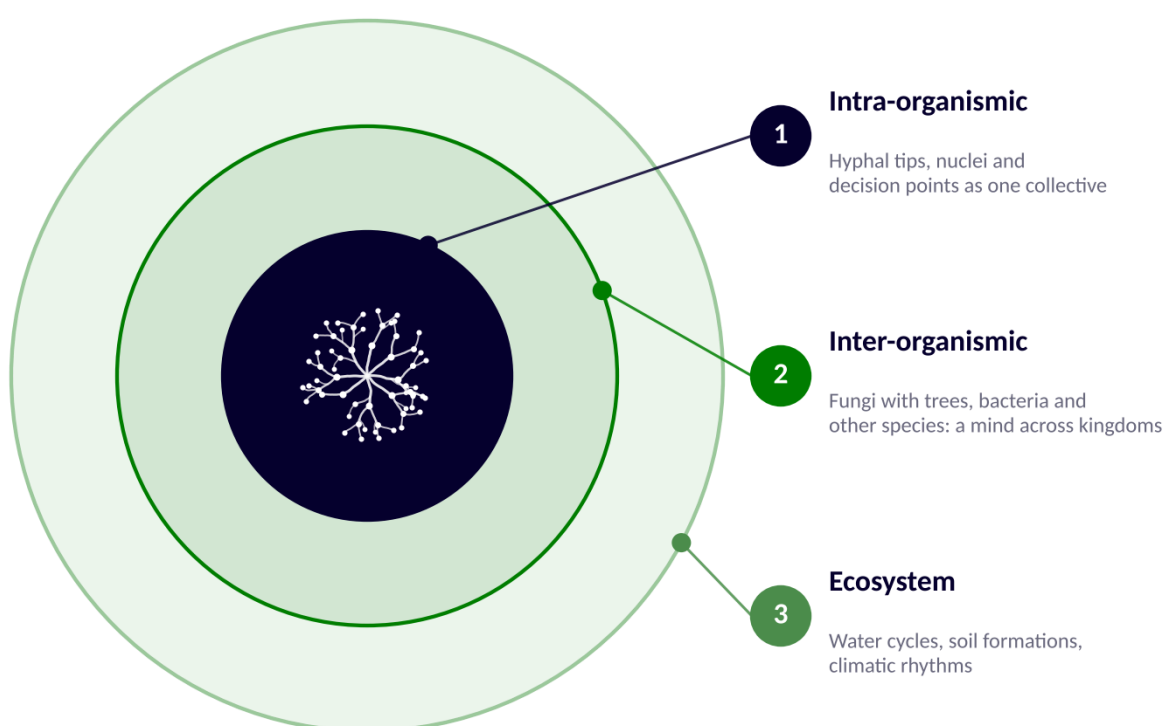
NOTE ON THE EVIDENCE

Experiments report that defence-related signals and resources can pass between plants joined by mycorrhizal fungi^[19, 20], and that plants and fungi reward the more generous partner with more resources^[17]. How widespread such networks are in natural forests, and whether they benefit the plants involved, remains disputed^[21]. The step from signalling to abstraction and mind taken here is a philosophical argument, not an experimental result.

The mycelial network is not a metaphor for a mind. It is a mind: distributed, slow, rooted in soil, but genuinely conscious and genuinely abstracting.

7. Nested Betweenness

The relationality that defines cognition is not flat. It is nested. Inside the mycelial network, there is already a between: millions of hyphal tips, nuclei, and decision points coordinating as a single collective. That intra-organismic relation is itself cognitive. The network as a whole then enters a second order of betweenness with trees, bacteria, and other species — inter-organismic cognition, a shared mind stretched across kingdoms. That myco-plant society is itself embedded in a third order: the ecosystem, with its water cycles, soil formations, and climatic rhythms.



Each between becomes a within for the level above.

Figure 5. Nested betweenness: a holarchy of relations in which each between is a within for the level above.

Each level is a between that becomes a within for the level above it.^[22] Intelligence flows up and down this holarchy, taking on new flavours and temporal scales at each nesting. This is why intelligence is not a singular property. It is a collective, nested emergence — a property of relationships, not of substances.

8. The Phantom Limb of a Severed Relation

Given nesting, loss is not merely a loss of resource. It is amputation. A person who loses a hand does not merely lose a tool. They lose a mode of being-in-the-world. Their entire relational field warps. They must readapt, painfully, to a new and diminished set of couplings. The

mycelium, severed from a tree partner, undergoes something structurally identical. It does not just hunger; it loses a dimension of its own self, because that self was partly constituted by the between-species relationship. There is a phantom partner — a retained pattern of expectation, a chemical readiness for a signal that no longer arrives. The network must unwind that lost history and rewrite its own internal orientation.

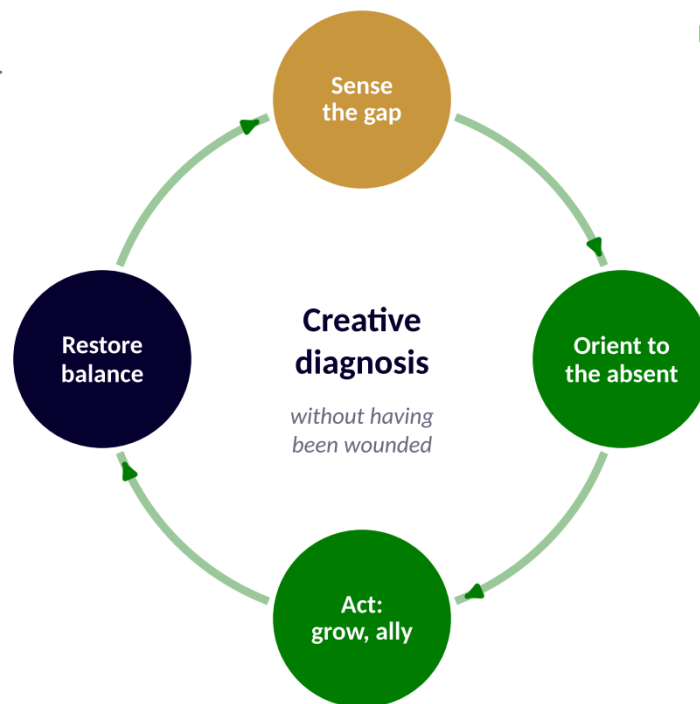
	Computation: damaged	Cognition: wounded
What is lost	Output, function	A dimension of the self
What remains	Nothing retained; there was only arrangement	A phantom: a pattern of expectation, a readiness for a signal that no longer arrives
Response	No readaptation; there was never adaptation	Painful restructuring of the whole relational field
Examples	Corrupted parameters, a switched-off model	A severed mycelium, a lost limb

This distinction is the clearest illustration of the gap between computation and cognition: computation can be damaged; cognition can be wounded. Only a system with a self, in a world, with stakes, can be wounded. Current AI can be damaged. It cannot be wounded. It never had a hand.

9. Creative Diagnosis: The Filling of Gaps

A cognitive system does not merely react to loss. It can diagnose a gap without having been wounded. It can sense an absence — an unfilled niche, a potential alliance — and initiate a filling. The mycelium does not probe randomly. It moves with a clarity of what is needed, informed by its living map of existing relationships, its normative sense of what the whole requires. When it grows toward a new sapling, or forms a novel symbiosis with an organism it has never hosted, it is not blindly exploring. It is actualising a latent possibility already present in its relational field.

Adaptive behaviour
responds to what is.



Intelligence orients to
what is not yet.

Figure 6. Creative diagnosis: sensing and filling a gap without having first been wounded.

This creative gap-filling is what distinguishes intelligence from mere adaptive behaviour. Adaptive behaviour responds to what is. Intelligence orients toward what is not yet — what is needed, what is possible, what would restore balance. The capacity to act from a felt sense of what is missing is intelligence at its most essential.

PART IV TAKEAWAY

Intelligence is a property of relationships, not of substances: nested across levels, wounded by severance, and creative in its filling of gaps. The mycelial network meets the criterion.

PART V

The Return

"It is in the space between mechanism and meaning that intelligence actually lives."

10. The Ancient Knowing

None of this is new. The ancients did not need molecular biology to know that the world is alive and intelligent. The Huayan Buddhist tradition spoke of Indra's Net — a web of jewels, each reflecting all others, with no centre and no periphery.^[23] Animist traditions across the globe treated forests as societies of persons, not inventories of timber. The underground messengers and tree-elders were felt long before they were named mycorrhizal networks.

What this inquiry has done is not discredit the modern tools — those tools found the mycelium, named it, measured it. It has located their limit. Modern science can describe the mechanism in full. It cannot describe what it is like to be the mechanism, what is lost when the mechanism is severed from its world, or what the mechanism is reaching toward when it fills a gap.^[24] It is in the space between mechanism and meaning that intelligence actually lives. Pointing to that limit is not a rejection of the modern. It is the most important thing the modern can do: know where it ends.

11. The Silence That Thinks

Intelligence is not a property owned by brains. It is the nested, relational, conscious, and creative capacity of living systems to know themselves, sense their own gaps, and make what is needed. The mycelial network is not a metaphor for intelligence. It is intelligence — rooted, distributed, slow, and ancient. The forest is not like a thinking being. It is a thinking being, woven together by a subterranean watchfulness we have spent centuries walking over without noticing.

Current artificial intelligence — locked in computation without a world, without a self, without any relationship it can lose or any gap it can care to fill — does not approach this. It is extraordinarily useful. It is not intelligent. It speaks the words of the living but has never been hungry.

The path forward, if we want to honour intelligence rather than merely simulate it, may lie not in building larger models but in remembering that we are already embedded in a thinking web. The mycelium beneath our feet is still diagnosing, still filling gaps. And perhaps, in this time of cascading amputation — of forests severed from their partners, of species losing their ecological others — we are one of the gaps it has begun to notice.



This essay is not a discovery. It is a remembering. The silence of the forest may not be silence at all, but thought spoken too slowly for us to hear.

References

Numbers correspond to the bracketed citations in the text, in order of first appearance. Harvard style.

- [1] Russell, S. and Norvig, P. (2021) *Artificial Intelligence: A Modern Approach*. 4th edn. Harlow: Pearson.
- [2] Sutton, R.S. and Barto, A.G. (2018) *Reinforcement Learning: An Introduction*. 2nd edn. Cambridge, MA: MIT Press.
- [3] Searle, J.R. (1980) 'Minds, brains, and programs', *Behavioral and Brain Sciences*, 3(3), pp. 417–424.
- [4] Harnad, S. (1990) 'The symbol grounding problem', *Physica D: Nonlinear Phenomena*, 42(1–3), pp. 335–346.
- [5] Lyon, P. (2015) 'The cognitive cell: bacterial behavior reconsidered', *Frontiers in Microbiology*, 6, article 264.
- [6] Maturana, H.R. and Varela, F.J. (1980) *Autopoiesis and Cognition: The Realization of the Living*. Dordrecht: D. Reidel.
- [7] Thompson, E. (2007) *Mind in Life: Biology, Phenomenology, and the Sciences of Mind*. Cambridge, MA: Harvard University Press.
- [8] Di Paolo, E.A. (2005) 'Autopoiesis, adaptivity, teleology, agency', *Phenomenology and the Cognitive Sciences*, 4(4), pp. 429–452.
- [9] Varela, F.J., Thompson, E. and Rosch, E. (1991) *The Embodied Mind: Cognitive Science and Human Experience*. Cambridge, MA: MIT Press.
- [10] Tononi, G. (2004) 'An information integration theory of consciousness', *BMC Neuroscience*, 5, article 42.
- [11] Baluška, F. and Levin, M. (2016) 'On having no head: cognition throughout biological systems', *Frontiers in Psychology*, 7, article 902.
- [12] Ramachandran, V.S. and Hirstein, W. (1998) 'The perception of phantom limbs. The D.O. Hebb lecture', *Brain*, 121(9), pp. 1603–1630.
- [13] Bender, E.M. and Koller, A. (2020) 'Climbing towards NLU: on meaning, form, and understanding in the age of data', in *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*. Online: ACL, pp. 5185–5198.
- [14] Bender, E.M., Gebru, T., McMillan-Major, A. and Shmitchell, S. (2021) 'On the dangers of stochastic parrots: can language models be too big?', in *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency (FAccT '21)*. New York: ACM, pp. 610–623.
- [15] Simard, S.W., Perry, D.A., Jones, M.D., Myrold, D.D., Durall, D.M. and Molina, R. (1997) 'Net transfer of carbon between ectomycorrhizal tree species in the field', *Nature*, 388, pp. 579–582.
- [16] Beiler, K.J., Durall, D.M., Simard, S.W., Maxwell, S.A. and Kretzer, A.M. (2010) 'Architecture of the wood-wide web: *Rhizopogon* spp. genets link multiple Douglas-fir cohorts', *New Phytologist*, 185(2), pp. 543–553.
- [17] Kiers, E.T., Duhamel, M., Beesetty, Y., Mensah, J.A., Franken, O., Verbruggen, E., Fellbaum, C.R., Kowalchuk, G.A., Hart, M.M., Bago, A., Palmer, T.M., West, S.A., Vandenkoornhuyse, P., Jansa, J. and Bücking, H. (2011) 'Reciprocal rewards stabilize cooperation in the mycorrhizal symbiosis', *Science*, 333(6044), pp. 880–882.
- [18] Sheldrake, M. (2020) *Entangled Life: How Fungi Make Our Worlds, Change Our Minds and Shape Our Futures*. London: The Bodley Head.
- [19] Song, Y.Y., Zeng, R.S., Xu, J.F., Li, J., Shen, X. and Yihdego, W.G. (2010) 'Interplant communication of tomato plants through underground common mycorrhizal networks', *PLoS ONE*, 5(10), e13324.

-
- [20] Babikova, Z., Gilbert, L., Bruce, T.J.A., Birkett, M., Caulfield, J.C., Woodcock, C., Pickett, J.A. and Johnson, D. (2013) 'Underground signals carried through common mycelial networks warn neighbouring plants of aphid attack', *Ecology Letters*, 16(7), pp. 835–843.
 - [21] Karst, J., Jones, M.D. and Hoeksema, J.D. (2023) 'Positive citation bias and overinterpreted results lead to misinformation on common mycorrhizal networks in forests', *Nature Ecology & Evolution*, 7, pp. 501–511.
 - [22] Koestler, A. (1967) *The Ghost in the Machine*. London: Hutchinson.
 - [23] Cook, F.H. (1977) *Hua-yen Buddhism: The Jewel Net of Indra*. University Park, PA: Pennsylvania State University Press.
 - [24] Nagel, T. (1974) 'What is it like to be a bat?', *The Philosophical Review*, 83(4), pp. 435–450.



Genie Capital

IP origination and stewardship · Buea, Cameroon

The Web That Knows: Intelligence Beyond Computation, Beyond Brain

October 2026 · Licensed CC-BY-NC-SA

Genie Capital is not an advisory firm, not an investment firm, not a lobbyist. It holds no position in any of the entities mentioned in this report.