GOT-V1-2b-3

On the Origin of Intelligence

Applied Distinction and Finite Branch-Space

Abstract

Intelligence is applied distinction.

A system, subsystem, organism, artefact-system, institution, or coupled arrangement exhibits intelligence when distinction-conditioned organisation alters downstream trajectory selection for a locus under specified reference conditions.

This definition is intentionally broader than cognition. Intelligence does not require consciousness, self-awareness, symbolic reasoning, explicit intention, language, belief, reflection, or human-like thought. These may appear in stronger intelligence forms, but they are not minimal. A cell repairing damage, an immune system modulating response, a body applying habit, a machine classifying input, an institution applying a rule, or a person using a map may all instantiate applied distinction under different regimes.

The definition is also narrower than usefulness. A mountain, river, star, cave, chemical gradient, weather system, or physical regularity may shape downstream outcomes. It may constrain movement, shelter, energy, timing, visibility, settlement, reaction, or survival. But a useful or consequential structure is not intelligent merely because it affects what happens. The discriminator is application by a locus. A distinction must be made operative in downstream trajectory selection.

The preceding papers established the inherited architecture. Paper 1 defined information as physical difference made relationally available as operational distinction for a locus. Paper 1a defined signal as preserved contrast through which relation can become physically available. Paper 1b made explicit the realism guardrail carried by that architecture: finite distinction-use is target-constrained, access-limited, scale- and horizon-indexed, comparator-answerable, and residual-bearing. Paper 2 defined knowledge as retained distinction: the persistence of an OA-keyed, OR-produced RAS as present accessible state under specified reference conditions.

This paper begins after those positions.

It does not ask how difference becomes information.
It does not ask how contrast becomes physically available.
It does not ask what status distinction has when retained.

It asks what happens when distinction is applied.

The answer is intelligence.

The canonical definition is:

Intelligence is the application of distinction-conditioned organisation to alter downstream trajectory selection for a locus under specified reference boundary, reference scale, operational horizon, discrimination/noise regime, and comparator discipline.

This paper therefore treats intelligence as a facet of the same discriminator architecture already established. Non-Trivial Intelligence is not a new primitive. It is Non-Trivial Computation under the intelligence facet: realised, comparator-stable downstream dependence on applied distinction-conditioned organisation.

The paper distinguishes information provenance from intelligence use.

Passive information is found distinction: distinction arising from lawful physical evolution, available as OP for a locus under specified RRP conditions, and not produced by prior NTC-level organisation as the relevant form. Mountains, rivers, stars, naturally occurring gradients, weather patterns, and geological structures may supply passive information where their contrasts become available as OP for a locus. They may shape branch-space. They are not intelligent merely because they constrain what later systems can do.

Active information is made distinction: distinction fixed into form by a producing locus through prior distinction-conditioned organisation under specified reference conditions. The producing locus may produce, select, shape, retain, maintain, or redeploy the relevant distinction. That production relation fixes active-information status. The status does not depend on present use, later encounter, or the producing locus remaining extant while the relevant made distinction remains physically instantiated. Biological form, immune memory, neural weighting, habit, nests, trails, tools, words, signs, maps, rules, measurement standards, procedures, institutions, and technical protocols may carry active information. They embody prior applied distinction. But active information is not intelligence in the present episode unless it is reused or applied by a locus. The applying locus may be the original producing locus or a later locus. Later encounter establishes a new access-and-use relation; it does not create the active-information provenance.

Passive intelligence is made distinction reused. It occurs when active information is used by a locus to alter downstream trajectory selection without recomputing the original selection problem. A traveller using a signpost, an organism relying on inherited morphology, a person following a map, a scientist using an instrument, a citizen using a legal category, or a machine using stored parameters may instantiate passive intelligence.

Active intelligence is distinction currently applied. It occurs where current distinction-conditioned organisation searches, regulates, repairs, inhibits, reallocates, recalibrates, selects, or controls downstream branch-space.

Compressed:

Within the inherited RRP architecture, information for a locus is operational distinction under specified reference conditions.

Signal is preserved contrast.

Knowledge is retained distinction.

Intelligence is applied distinction.

Passive information is found distinction.

Active information is made distinction.

Passive intelligence is made distinction reused.

Active intelligence is distinction currently applied.

Non-Trivial Intelligence is NTC under the intelligence facet.

The next paper will turn from applied distinction to bounded registration.

That is observation.

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1. Intelligence as applied distinction

1.1. The problem after Knowledge

The previous paper defined knowledge as retained distinction.

A system knows, in the minimal sense, when a prior distinction has been registered and retained as present accessible state under specified reference conditions. The canonical carrier of minimal knowledge is RAS: an OA-keyed, OR-produced retained token-state anchored in OP and indexed to RRP.

That definition solved the retained-state problem.

It did not yet solve the application problem.

A retained distinction may exist without being used. A retained memory state may persist without guiding action. A database entry may remain unqueried. A calibration record may remain unapplied. A map may remain unread. A legal rule may remain dormant. A stored parameter may remain bypassed. A biological state may remain present without altering the downstream trajectory currently under evaluation.

Such cases may still be knowledge in the record-present sense.

They are not yet intelligence in the present episode.

The intelligence question begins when distinction is made operative.

What happens when retained, available, inherited, embodied, externalised, or currently registered distinction alters which downstream trajectory classes are realised?

What changes when a locus uses a distinction to search, repair, regulate, inhibit, reallocate, recalibrate, route, classify, select, avoid, amplify, stabilise, or correct?

What makes a distinction not merely present, but applied?

This paper answers those questions.

Knowledge emphasises retention.

Intelligence emphasises application.

The difference is simple but decisive. A distinction may be available without being retained. It may be retained without being applied. It may be applied without being conscious. It may be useful to an external observer without being applied by the locus under evaluation. It may shape outcomes by physical constraint alone without becoming intelligence.

The paper therefore begins from a controlled sequence.

Within the inherited RRP architecture, information for a locus is operational distinction under specified reference conditions.

Signal is preserved contrast.

Knowledge is retained distinction.

Intelligence is applied distinction.

This sequence prevents intelligence from being used as a loose synonym for information, knowledge, adaptation, complexity, usefulness, success, or cognition.

1.2. Intelligence is applied distinction

The core claim is:

Intelligence is applied distinction.

A distinction becomes intelligence-relevant when it is made operative in downstream trajectory selection for a locus.

The distinction may be currently discriminated. It may be retained as RAS. It may be redeployed through RSD. It may be inherited in morphology. It may be stabilised as habit. It may be externalised in a tool. It may be transmitted through language. It may be fixed in a rule. It may be installed in an institution. It may be encoded in a technical protocol. It may be distributed across a coupled arrangement.

The carrier does not define intelligence.

The application does.

A retained distinction that is never applied is not intelligence in the present sense. A useful structure that shapes outcomes by lawful physical constraint alone is not intelligence in the present sense. A correlation that is noticed only by an external analyst is not intelligence in the present sense. A system that succeeds by accident, drift, or background dynamics has not thereby exhibited intelligence.

Intelligence begins where distinction-conditioned organisation changes downstream branch-space.

A branch is an alternative trajectory, state, outcome, transition, action, classification, repair path, inhibition path, continuation path, or later registration that may or may not become realised under the operative regime. Branch-space is the field of such alternatives as available to a locus under reference conditions.

A system applies distinction when which branch occurs depends on the distinction.

A cell applies distinction when damage-state registration alters repair rather than replication. An immune system applies distinction when antigenic distinction alters activation rather than tolerance. A nervous system applies distinction when retained weighting alters perception or action. A person applies distinction when a memory, map, sign, or rule changes route selection. A machine applies distinction when classified input alters output. An institution applies distinction when a category, record, rule, or precedent alters procedure.

In each case, the question is not whether the locus “thinks.”

The question is whether distinction-conditioned organisation alters downstream trajectory selection.

This is why intelligence is not a mental essence. It is an operational relation.

1.3. Broader than cognition

Human cognition is a powerful architecture of intelligence. It is not the measure of intelligence in general.

Reasoning, planning, symbolic manipulation, language, self-reflection, imagination, explicit deliberation, and propositional judgement are sophisticated forms of applied distinction. They allow distinction to be retained, recombined, simulated, corrected, narrated, justified, communicated, and redeployed across long horizons.

But they are not minimal.

A framework that begins with human cognition mistakes a late organisational expression for the primitive discriminator.

A cell need not deliberate in order to repair damage. An immune pathway need not form a proposition in order to modulate response. A slime mold need not reason linguistically in order to alter extension, retraction, reinforcement, or routing. A habit need not be consciously represented in order to guide action. A machine process need not understand in order to classify and select. An institution need not possess a unified mind in order to apply a rule that changes downstream outcomes.

The relevant question is not whether the locus has consciousness.

The relevant question is whether distinction-conditioned organisation is applied to downstream trajectory selection under specified reference conditions.

This anti-anthropocentric stance does not inflate intelligence. It does the opposite. It removes human resemblance as the privileged discriminator and replaces it with application conditions.

A system does not become intelligent by seeming mental.

It becomes intelligence-relevant where applied distinction changes branch-realisation.

This allows the framework to recognise intelligence below cognition without treating every successful physical process as intelligent. A living cell may apply distinction. A body may apply habit. A tool may participate in applied distinction. A rule may carry prior selection into a later procedure. A computational system may apply token distinctions. A scientific practice may apply measurement and model distinctions.[1]

The substrate varies.

The discriminator remains application.

1.4. Narrower than usefulness

Intelligence is also narrower than usefulness.

Many structures shape downstream outcomes. A mountain redirects movement and weather. A river shapes settlement, ecology, irrigation, transport, and boundary formation. A cave supplies shelter. A star supplies energy. A coastline shapes trade and defence. A chemical gradient may guide reaction or movement. A seasonal cycle may structure reproductive timing. A geological formation may channel water or provide refuge.

These structures matter.

They may be available as information for a locus.

They may alter branch-space.

They may become part of intelligent behaviour when a locus uses them.

But they are not intelligent merely because they constrain outcomes.

If usefulness were sufficient for intelligence, every slope, barrier, gradient, regularity, channel, shelter, rhythm, and physical asymmetry would become intelligent. The concept would collapse into consequentiality.

The framework blocks that collapse.

The distinction is not between important and unimportant structures. It is between distinctions that merely shape outcomes and distinctions that are applied by a locus through distinction-conditioned organisation.

A mountain is passive information for a traveller. It becomes intelligence-relevant when the traveller uses its position, slope, visibility, or route constraints to alter movement. A river is passive information for a community. It becomes intelligence-relevant when the community maps it, bridges it, irrigates from it, navigates by it, or regulates settlement around it. A star is passive information for a navigator. It becomes intelligence-relevant when used in orientation. A chemical gradient is passive information for a cell only where it becomes available through receptor and pathway conditions; it becomes intelligence-relevant when the cell's organisation applies the distinction to alter movement, metabolism, repair, or regulatory state.

The intelligence lies in the applied relation, not in the physical structure alone.

Usefulness is not enough.

Application by a locus is required.

1.5. Regime-relative application

Intelligence is never absolute.

It is indexed to a locus, boundary, scale, horizon, discrimination/noise regime, branch-space, and comparator family.

A system may be intelligent at one scale and not another. A retained distinction may guide immediate action but fail over longer horizons. A tool may be intelligence-relevant for one user and inert for another. A rule may guide one institution and remain meaningless outside that procedure. A map may alter route selection for someone trained to read it and remain surface pattern for another system. A model may alter one decision system while remaining archived active information elsewhere.

Intelligence claims therefore require reference discipline.

What is the locus?

What distinction is being applied?

Through what interface does the distinction become available?

At what reference scale is downstream trajectory selection evaluated?

Over what operational horizon does the outcome difference matter?

What discrimination/noise regime separates relevant distinction from irrelevant variation?

What organisational pathway makes the distinction operative?

What comparator would show that downstream trajectory selection depends on that distinction?

Without those questions, intelligence-language drifts. A successful outcome is called intelligent because it succeeded. A biological process is called intelligent because it appears adaptive. A machine output is called intelligent because it resembles human response. A social institution is called intelligent because it solves coordination problems. A physical regularity is called intelligent because an external analyst can use it.

These may be locally useful descriptions. They are not yet disciplined.

A strong intelligence claim must specify the applied distinction and the locus for which downstream trajectory selection changes.

Intelligence is therefore reference-indexed application under constraint.

The application is relative.

The constraint is real.

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2. Inherited architecture, not new mechanism

2.1. What this paper inherits

This paper does not introduce a new primitive.

It inherits the architecture already installed by the preceding papers.

From Paper 1, it inherits RRP and the RRP Set. RRP fixes the reference node from which distinction evaluation becomes well-posed. OP supplies available contrast. OA classes available contrast. OR registers one classed alternative into state. RAS retains the registered distinction. RSD redeploys retained distinction into later branch-realisation.

From Paper 1a, it inherits the physical signal pathway. Signal is preserved contrast through which relation can become available. Signal-bearing contrast may enter OP only where it becomes available to a locus-interface-regime under specified conditions.

From Paper 1b, it inherits the realism-facing guardrail. Applied distinction is not an unbounded grasp of a target relation. It is finite, indexed use of distinction under locus, boundary, interface, scale, horizon, discrimination/noise regime, comparator discipline, and residual. An intelligence claim therefore cannot be strengthened merely by naming success, usefulness, adaptation, or apparent competence. The applied distinction must remain localisable and answerable to the relation it claims to preserve.

From Paper 2, it inherits the knowledge facet. Knowledge is retained distinction. RAS is the canonical carrier of minimal knowledge. TK is record-presence. KIP is grounded deployability. NTK is realised deployment.

Paper 3 asks a different question.

What happens when distinction is applied?

The answer does not require replacing the architecture. It requires translating the architecture into the intelligence facet.

Under the knowledge facet, the explanatory emphasis is retention.

Under the intelligence facet, the explanatory emphasis is application.

The same retained distinction may be knowledge in one respect and intelligence-relevant in another. A memory as retained state is knowledge. A memory guiding action is intelligence-relevant. A map as record is knowledge-bearing. A map used to change route selection participates in intelligence. A rule as retained institutional form is active information. A rule applied to classify a case participates in intelligence.

The mechanism does not multiply.

The facet changes.

The same structural roles may recur across the series: a distinction may be merely present, groundedly deployable, or actually operative. In this paper, however, the relevant question is not whether a retained record qualifies as knowledge. It is whether distinction-conditioned organisation is applied to downstream trajectory selection. Intelligence-status is therefore assigned by application, not by retention alone. Where a retained distinction is unused, the correct claim remains knowledge or active information. Where that distinction alters branch-space for a locus, it becomes intelligence-relevant.

2.2. Non-Trivial Intelligence as NTC under the Intelligence facet

Non-Trivial Intelligence is Non-Trivial Computation under the intelligence facet.

NTC is the canonical realised discriminator condition: organisation-dependent, counterfactually testable downstream outcome dependence on discriminable distinctions under specified reference conditions and comparator discipline.

When the explanatory emphasis is applied distinction, that condition appears as NTI.

NTI is present where distinction-conditioned organisation is applied to alter downstream trajectory selection in a comparator-stable way, and where that dependence collapses, degrades, or changes under adequate comparator pressure targeted at the relevant organisation.

NTI is not a new mechanism.

It is not a mental substance.

It is not consciousness.

It is not successful behaviour alone.

It is not a high score, useful output, adaptive appearance, or complex response.

It is the realised application of distinction-conditioned organisation to downstream trajectory selection under comparator discipline.

Minimal NTI may involve one applied distinction episode. Stronger cases may involve long retention chains, recursive redeployment, learning, search, recalibration, multi-step control, symbolic mediation, model use, institutional procedure, tool-supported reasoning, or cumulative culture.

Those stronger forms are expansions of the same discriminator.

They are not minimal requirements.

This keeps the paper aligned with the rest of the series. Intelligence is not a separate metaphysical domain. It is a facet of the architecture through which distinction becomes operative in branch-realisation.

2.3. BD and IPL as comparator and localisation discipline

Baseline Dynamics remains the comparator discipline.

A system does not qualify as intelligent merely because it behaves successfully. A structure does not qualify as passive intelligence merely because it is useful. A process does not qualify as active intelligence merely because it changes state. A machine does not qualify as intelligent merely because its output resembles an intelligent answer. An institution does not qualify as intelligent merely because it produces coordinated results.

The relevant question is whether distinction-conditioned organisation makes a counterfactual difference to downstream trajectory selection under comparable conditions.

An adequate comparator preserves the relevant boundary context, driving, component inventory, reference scale, operational horizon, and discrimination/noise assumptions while disabling, scrambling, neutralising, resetting, bypass-controlling, or otherwise varying the organisation under test.

If downstream trajectory selection remains the same when the proposed distinction-conditioned organisation is removed or bypassed, the strong intelligence claim fails or must be weakened.

If downstream dependence collapses, degrades, or changes in the expected way, the intelligence claim gains support.

The Information Processing Locus remains the localisation discipline.

IPL identifies where distinction-conditioned organisation does the relevant work. It tells us what must remain intact for downstream trajectory selection to depend on the distinction, and what an adequate comparator must target.

The IPL may be elementary or composite. It may be internal to an organism, distributed across body and environment, embedded in an artefact system, sustained through a protocol, or distributed through institutional roles and records.

No privileged substrate is assumed.

But the locus must not drift.

An intelligence claim fails if the explanatory work is silently moved from the system to the environment, from the environment to an external observer, from an artefact to a user, from a user to an institution, from an institution to an analyst, or from a retained record to an unrelated downstream effect.

Application must be localised.

Comparator discipline prevents success from being mistaken for intelligence.

IPL discipline prevents diffuse usefulness from being mistaken for applied distinction.

2.4. Application, not possession, retention, or usefulness

Intelligence is not possession.

A system does not become intelligent merely by containing information, records, rules, memories, parameters, tools, or structures. These may be knowledge-bearing or active information. They become intelligence-relevant only where they are applied to downstream trajectory selection.

Intelligence is not retention.

A retained distinction may exist as TK. It may be deployable as KIP. It may even be part of an organisation that could support later application. But unless it is made operative in the episode or regime under evaluation, the warranted claim is knowledge or active information, not intelligence.

Intelligence is not usefulness.

A structure may be useful without being applied by a locus. A rock may serve as a shelter, a river as a route, a star as an energy source, a cave as protection, a regularity as a predictor. The usefulness may be real. But intelligence begins only where a locus applies distinction to alter downstream branch-realisation.

Intelligence is not external interpretation.

An analyst may describe a process as if it selected intelligently. That description is not enough. The applied distinction must be supported by the system, subsystem, artefact arrangement, institution, or coupled organisation under evaluation.

This gives the central exclusion:

No applied distinction, no intelligence-status.

The paper therefore treats intelligence as an operational status, not a compliment.

It is not a scale of admiration.

It is not a synonym for complexity.

It is not a projection of mind into matter.

It is the application of distinction-conditioned organisation in finite branch-space.

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3. Downstream trajectory selection

3.1. Locus

A locus is the unit relative to which applied distinction is evaluated. In the intelligence facet, this means the unit for which downstream trajectory selection changes because a distinction is made operative. The locus is not automatically the producer of the distinction, the carrier that stores it, the artefact that transmits it, the environment that makes it useful, or the external interpreter who recognises its value. Provenance may lie elsewhere. For an active-information claim, that elsewhere includes the producing locus whose prior distinction-conditioned organisation fixed the made status. The producing locus and the locus of present intelligence may therefore differ. The first establishes provenance; the second is the locus whose branch-space is presently being evaluated. The distinction may have been produced by another system, retained in another substrate, or inherited through a tool, sign, rule, model, habit, morphology, or institution. But for the intelligence claim at hand, the distinction must

become available to the evaluated locus and must alter that locus's branch-space through an operative organisational pathway.

The locus need not be conscious.

It need not be human.

It need not be biological.

It need not be contained inside one body.

It must, however, be the unit for which downstream trajectory selection is being evaluated.

In the intelligence facet, locus discipline asks:

For whom or for what does the applied distinction alter branch-space?

A signpost does not itself select the traveller's route unless the signpost is part of a larger coupled route-selection system. A map does not itself navigate unless embedded in a process that reads and applies it. A law does not itself decide unless an institutional arrangement applies it. A stored parameter does not itself classify unless the system's operation routes through it. A biological morphology does not itself "think," but it may alter downstream movement, perception, metabolism, or survival options for the organism.

The locus must therefore be drawn at the level where application occurs.

Too narrow a locus misses the applied relation. Too broad a locus hides the mediating organisation. Too familiar a locus imports assumptions from ordinary language. Too diffuse a locus allows intelligence to be attributed to everything involved in a successful outcome.

The correct locus is not necessarily the first named object.

It is the organisation whose downstream trajectory selection depends on the applied distinction under the claim being made.[2]

3.2. Downstream trajectory selection

Downstream trajectory selection is the differential realisation of later outcome classes under specified reference conditions.

A downstream trajectory is selected when one later outcome class rather than another becomes more likely, more stable, more accessible, more preserved, more inhibited, more repaired, more amplified, more excluded, or otherwise differentially realised because of distinction-conditioned organisation.

Selection does not mean conscious choice.

It means constraint-mediated outcome differentiation.

A cell selects a downstream trajectory when damage distinction alters repair rather than replication. An immune system selects a downstream trajectory when antigenic distinction alters activation rather than tolerance. A body selects a downstream trajectory when pain distinction alters movement. A person selects a downstream trajectory when a map alters route. A machine selects a downstream trajectory when classified input alters output. An institution selects a downstream trajectory when a legal category alters permission, sanction, exclusion, obligation, or remedy.

The downstream trajectory need not be final. It is downstream relative to the operational horizon.

A trajectory may be molecular, cellular, behavioural, cognitive, computational, institutional, social, technical, ecological, or distributed. What matters is that the applied distinction changes which outcome class is realised.

The term branch-space names the field of relevant alternatives under the reference conditions. Intelligence operates in finite branch-space because no locus confronts all possible outcomes. It encounters alternatives through boundary, interface, channel, scale, horizon, abstraction, retained structure, and organisational capacity.

Intelligence is therefore not omniscience or unconstrained optimisation.

It is local application inside finite branch-space.[3]

3.3. Applied distinction

An applied distinction is a distinction made operative in downstream trajectory selection.

The distinction may come from many sources.

It may be currently sensed. It may be retained in RAS. It may be redeployed through RSD. It may be inherited in morphology. It may be embodied in a tool. It may be stabilised as habit. It may be encoded in a sign. It may be expressed in a rule. It may be stored in a database. It may be trained into model parameters. It may be distributed through institutional procedure.

The source does not decide intelligence-status.

The present application does.

A distinction that exists but does not alter downstream selection is not applied distinction. A retained form that is never redeployed is not applied distinction in the present episode. A physical regularity that constrains outcomes without being used by a locus as distinction-conditioned organisation is not applied distinction. A description supplied only by an external observer is not applied distinction for the locus.

Applied distinction is the hinge between information and intelligence.

It is also the hinge between knowledge and intelligence.

Information may be available.

Knowledge may be retained.

Intelligence occurs where distinction becomes operative.

This does not mean that all intelligence requires prior knowledge. Some applied distinctions may be immediate, embodied, morphological, reactive, or currently registered without durable retention. But many strong intelligence systems depend on retained distinctions, inherited structures, external records, and redeployment pathways.

The intelligence question is always:

What distinction is doing work now?

3.4. Comparator test for applied distinction

The operational test for applied distinction is counterfactual.

Would downstream trajectory selection differ if the distinction-conditioned organisation were absent, altered, scrambled, bypassed, neutralised, reset, or otherwise disabled under comparable conditions?

If the answer is no, the intelligence claim weakens.

If the answer is yes, the claim strengthens.

The comparator must target the mediating organisation. It is not enough to remove the whole system and observe that outcomes change. That proves only that the system mattered. It does not show that the proposed distinction-conditioned organisation did the work.

A strong test preserves relevant context while varying the discriminator.

For a cell repair pathway, the comparator asks whether repair selection changes when the damage-sensitive pathway is disabled while relevant cellular context remains comparable.

For a map-guided route, the comparator asks whether route selection changes when the map distinction is absent, wrong, unreadable, or bypassed while the traveller's goal and environment remain comparable.

For a machine classifier, the comparator asks whether output classes change when the discriminating feature, model weight, rule, or representation is altered under controlled input conditions.

For an institution, the comparator asks whether case outcome changes when the relevant category, record, rule, precedent, or procedure is removed, altered, or bypassed while the case context remains comparable.

This test does not require perfect experimental control in every real-world case. It requires the claim to be formulated so that dependence could be assessed.

Where no comparator can be specified, the claim should be weakened.

It may remain plausible applied distinction.

It may remain apparent intelligence.

It may remain external interpretation.

It should not be promoted to strong Non-Trivial Intelligence.

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4. The provenance/use ladder

4.1. Why provenance and use must be separated

The intelligence paper requires one additional distinction that the previous papers did not need to foreground:

the difference between provenance and use.

Provenance asks where a distinction came from.

Use asks whether a distinction is currently applied.

These questions are often collapsed.

A natural structure is treated as intelligent because it is useful. But its provenance may be lawful physical evolution without prior distinction-conditioned organisation.

A made structure is treated as intelligent because it embodies prior selection. But in the present episode it may simply persist as active information without being used.

A retained record is treated as intelligence because it is available. But availability is not application.

A tool is treated as intelligent because it encodes prior work. But it becomes intelligence-relevant only when a locus uses it.

A rule is treated as intelligent because it stabilises prior distinction. But it alters branch-space only when applied by an institution or agent.

A machine system is treated as intelligent because it contains trained parameters. But the relevant intelligence claim depends on whether those parameters are applied to downstream trajectory selection under specified conditions.

The paper therefore separates four statuses:

Passive information is found distinction.

Active information is made distinction.

Passive intelligence is made distinction reused.

Active intelligence is distinction currently applied.

This ladder keeps two commitments together.

First, intelligence is broader than cognition. It can involve biological, material, symbolic, technical, institutional, and distributed application.

Second, intelligence is narrower than usefulness. Not every consequential distinction is intelligent.

The ladder allows natural constraint, made form, reused form, and current application to be named without collapse.

4.2. Passive information: found distinction

Passive information is found distinction.

More precisely:

Passive information is distinction arising from lawful physical evolution, available as OP for a locus under specified RRP conditions, but not produced by prior NTC-level organisation as the relevant form.

Passive information includes mountains, rivers, stars, caves, oceans, weather systems, naturally occurring gradients, light/dark cycles, seasonal rhythms, terrain features, chemical distributions, geological formations, and other physical structures or regularities that may become available to a locus.

Passive information may be highly consequential.

A mountain can shape weather, route selection, settlement, defence, visibility, water flow, and symbolic orientation. A river can structure ecology, agriculture, transport, migration, political boundary formation, and settlement. A star can condition energy availability and

navigation. A cave can make shelter possible. A chemical gradient can alter molecular or organismic movement. A seasonal cycle can alter timing.

These structures may become available as distinction.

They may be mapped, followed, avoided, used, modelled, anticipated, or incorporated into planning.

But passive information is not intelligence merely because it matters.

The distinction is found by the locus, not made by prior distinction-conditioned organisation in the relevant form. It may be available. It may be constraining. It may be useful. It may even be necessary for intelligent action. But it is not itself intelligence.

Passive information becomes intelligence-relevant when a locus applies it.

A traveller uses the mountain as route constraint. A navigator uses the star. A community uses the river. A cell uses the gradient. A species uses seasonal cycles. A scientist uses naturally occurring variation as evidence. A machine uses environmental input as classification-relevant feature.

In each case, intelligence begins at application.

The found distinction supplies branch-space.

The locus applies it.

4.3. Active information: made distinction

Active information is made distinction.

More precisely:

Active information is distinction fixed into form by a producing locus through prior distinction-conditioned organisation under specified reference conditions. The relevant form may have been produced, selected, shaped, retained, maintained, or redeployed through that organisation.[4]

The producing locus fixes the active-information provenance. It may later be absent, inactive, dissolved, dead, or otherwise no longer available. The made distinction remains active information while its relevant distinction-bearing organisation remains physically instantiated. A later locus does not create that status by encountering the form.

Active information includes biological form, immune memory, neural weighting, habit, learned disposition, nest, trail, tool, signpost, road, bridge, building, map, written record, measurement standard, rule, procedure, technical protocol, institution, language, model, database, and trained parameter.

Active information carries prior applied organisation.

A nest is active information because prior behaviour selected and stabilised material arrangement. A signpost is active information because route distinction, symbolic convention, material placement, and anticipated future use have been stabilised. A map is active information because prior observation and abstraction have been retained in usable form. A rule is active information because prior distinctions over cases, permissions, obligations, harms, or procedures have been stabilised. A trained parameter is active information because prior exposures have shaped present processing structure.

Active information differs from passive information by provenance.

It is made.

Its present form is historically dependent on prior distinction-conditioned organisation.

The production RRP and any later access or application RRP must remain distinct. The production RRP establishes that the relevant distinction was made by a locus. A later RRP establishes whether another locus can encounter, class, retain, reinterpret, or apply that inherited distinction. Failure of later access does not cancel the completed production provenance.

But active information is not automatically intelligence in the present episode.

A signpost standing unread is active information, not present intelligence. A map in a drawer is active information, not present intelligence. A law not invoked is active information, not present institutional intelligence. A stored parameter bypassed by a system is active information, not present applied distinction. A habit unavailable to action is active information, not current intelligence. A tool unused on a shelf is active information, not present tool-mediated intelligence.

Active information becomes intelligence-relevant when a locus reuses or applies it.

This transition is the hinge of the next section.

Active information is made distinction. It carries prior distinction-conditioned organisation, but it becomes intelligence only when a locus reuses or applies it in downstream trajectory selection.

4.4. Passive intelligence: made distinction reused

Passive intelligence is made distinction reused.

It occurs when active information is taken up and used by the original producing locus or by a later locus to alter downstream trajectory selection without recomputing, rediscovering, rebuilding, or re-solving the original selection problem that produced the distinction.

The term passive must be read carefully.

Passive intelligence is not inactive intelligence. It is not dormant knowledge. It is not mere record-presence. It is not a stored state sitting unused. It is passive only relative to the original selection problem. The prior work has already been done elsewhere, earlier, or by another organisation. Where the same locus reuses its own earlier made distinction, the separation is temporal rather than cross-locus. Where another locus reuses it, the separation is both temporal and relational. The present locus reuses the result.

A signpost is active information. It becomes passive intelligence when a traveller reads it and changes route without surveying the whole terrain. A map is active information. It becomes passive intelligence when a user relies on its retained route distinctions without reconstructing them from direct exploration. A road is active information. It becomes passive intelligence when a driver uses its inherited path structure to move efficiently through a landscape without solving the route from scratch. A rule is active information. It becomes passive intelligence when an institution applies it to classify a case without re-deriving the whole history of prior distinctions that stabilised the rule.

Passive intelligence therefore depends on prior made distinction, but it is still present application.

The locus is doing something with inherited form.

The reuse changes branch-space.

A tool, sign, map, habit, standard, architectural layout, measurement convention, language, protocol, database, trained parameter, or institutional category may all support passive intelligence where the prior distinction they carry is redeployed by a locus to alter downstream selection.

The key test is not whether the form was made intelligently in the past.

The key test is whether its made distinction is currently reused by a locus.

A map in a drawer is active information.

A map consulted to alter route selection is passive intelligence.

A law in a book is active information.

A law applied to decide a case is passive intelligence.

A trained parameter stored but bypassed is active information.

A trained parameter used to classify input is passive intelligence.

Passive intelligence is therefore not merely found, and not merely made.

It is made distinction reused.[5]

4.5. Active intelligence: distinction currently applied

Active intelligence is distinction currently applied.

It occurs where current distinction-conditioned organisation alters downstream trajectory selection through ongoing discrimination, search, regulation, repair, inhibition, reallocation, recalibration, classification, modelling, or control.

Active intelligence is not merely using a prior result. It is current application of distinction to the present branch-space.

A cell actively applies distinction when it registers damage and redirects resources into repair. An immune system actively applies distinction when antigenic recognition alters activation, tolerance, memory formation, or suppression. A nervous system actively applies distinction when present sensory, memory, and motor conditions alter action. A person actively applies distinction when weighing alternatives, revising a plan, correcting a route, or inhibiting an impulse. A machine actively applies distinction when current classification alters output. An institution actively applies distinction when evidence, rule, record, and procedure jointly determine a case outcome.

Active intelligence may use passive intelligence.

A person actively navigating may use a map. A scientist actively experimenting may use instruments, prior records, and inherited methods. An institution actively deciding may use rules, precedents, databases, forms, and categories. A machine actively classifying may use trained parameters, stored weights, architectures, and protocols. A cell actively regulating may use inherited molecular structure and prior pathway states.

Most strong intelligence systems combine many layers.

They apply current distinction through inherited form.

They reuse active information while also generating new distinction.

They retain outputs that may later become knowledge or active information for future intelligence.

This does not collapse the statuses. It shows how they compose.

Active intelligence names the current application episode or regime.

Passive intelligence names reuse of prior made distinction.

Active information names distinction whose relevant form was made through prior distinction-conditioned organisation, whether or not it is presently reused or available to a later locus.

Passive information names found distinction available to be used.

The ladder therefore distinguishes provenance and use while allowing real systems to combine them.

4.6. Compressed ladder

The full ladder can now be stated:

Passive information is found distinction.

Active information is made distinction.

Passive intelligence is made distinction reused.

Active intelligence is distinction currently applied.

These four positions are not moral rankings, cognitive rankings, or measures of sophistication. They are status distinctions.

Passive information may be simple or vast. A mountain range, river system, weather pattern, chemical gradient, or stellar cycle may shape enormous branch-spaces without itself being intelligence.

Active information may be simple or complex. A scratch mark, tool edge, footprint, habit, sign, written token, immune memory, instrument calibration, or legal rule may carry prior made distinction.

Passive intelligence may be weak or powerful. Reusing a signpost is simple. Reusing a mathematical proof, legal system, scientific instrument, technical standard, language, or trained model may be highly powerful.

Active intelligence may be minimal or elaborate. A cell's regulatory switch, an organism's search, a person's reasoning, a machine's classification, a laboratory's experimental redesign, or an institution's case procedure may all instantiate current application at different scales.

The ladder therefore prevents four errors.

First, it prevents passive information from being called intelligence merely because it shapes outcomes.

Second, it prevents active information from being called intelligence merely because it embodies prior organisation.

Third, it prevents passive intelligence from being mistaken for inactivity, since reuse is a present operation.

Fourth, it prevents active intelligence from being restricted to human-like cognition, since current application may occur in biochemical, organismic, technical, institutional, or distributed systems.

The discriminator remains the same throughout:

What distinction is available?

Was its relevant form found or made?

If made, which locus produced it and under what reference conditions?

Which locus, if any, is currently using it?

Does that use alter downstream trajectory selection for the evaluated locus under the stated conditions?

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5. Passive Intelligence

5.1. Passive intelligence is not inactivity

The phrase passive intelligence may mislead if read too quickly.

Passive intelligence is not passive in the sense of doing nothing. It is passive relative to the original production of the distinction, not passive relative to present use.

When a traveller follows a signpost, the traveller does not build the route distinction from scratch. Prior agents surveyed, classified, named, inscribed, placed, and maintained the sign. The traveller reuses that made distinction. The current route selection is active at the level of the traveller, but passive relative to the original distinction-producing labour.

When a person reads a map, the person does not resurvey the territory. The map condenses prior observation, abstraction, measurement, inscription, and convention into active information. The reader applies that retained structure to route selection.

When an institution applies a rule, it does not reconstruct every prior case, conflict, norm, argument, and settlement that stabilised the rule. It reuses made distinction.

When a computational system applies trained parameters, it does not rerun the entire training history in the present episode. It reuses a retained form shaped by prior exposures and optimisation.

In each case, passive intelligence is economical.

It allows a locus to inherit prior selection and use it now.

The result is reduced recomputation, faster branch selection, expanded reach, and often greater stability across cases. The locus does not need to rediscover the route, rebuild the tool, reinvent the category, re-run the experiment, re-prove the theorem, reclassify the entire archive, or re-learn the parameter from zero.

Passive intelligence is therefore one of the main mechanisms by which intelligence becomes cumulative.

It lets applied distinction travel across time, bodies, tools, records, symbols, institutions, and generations.

5.2. Locus-relative reuse

Passive intelligence is always locus-relative.

The same active information may be passive intelligence for one locus and inert form for another.

A signpost is passive intelligence for a traveller who can read it and use it to change route. It is visual texture for an animal without the relevant symbol regime. It is physical obstruction for a maintenance machine. It is legal evidence for an institution under a different RRP. The same carrier supports different relations.

A map is passive intelligence for a trained user, active information in an archive, evidence in a court, decoration in a room, unreadable marks for a non-reader, and training data for a machine system.

A law is passive intelligence for an institution applying it. It is active information in a codebook. It may be inert text for a person without access to the relevant procedure. It may be an object of study for a historian. It may be a constraint on action for a citizen only where institutional enforcement and recognition pathways make it operative.

A trained model parameter is passive intelligence when the system routes current input through it. It is active information when stored. It is inert physical state if inaccessible. It is evidence for an external analyst under another relation.

This is why provenance alone cannot decide status.

The made distinction must enter the current locus's branch-space.

It must be available through the relevant interface.

It must be classable under the relevant regime.

It must be applied in downstream trajectory selection.

Passive intelligence therefore requires both made distinction and present uptake.

No uptake, no passive intelligence.

5.3. Reduced recomputation

Passive intelligence reduces recomputation.

The phrase does not need to be read narrowly as digital computation. It names a general economy of branch-space. A locus can use prior made distinction without reconstructing the original pathway by which that distinction was produced.

A path worn through terrain saves later walkers from searching the entire landscape. A tool edge saves a user from reproducing the material selection and shaping process. A language saves speakers from inventing categories at every encounter. A measurement standard saves laboratories from recreating base comparisons every time. A map saves travellers from direct exploration. A theorem saves mathematicians from re-deriving all prior steps. A legal category saves institutions from re-forming procedure from first principles for each case.

The saved work is not magic. It is stored in form, convention, arrangement, record, practice, calibration, or pathway.

Passive intelligence is possible because active information carries prior discrimination forward.

The current locus uses that prior discrimination to narrow, weight, open, close, or stabilise present branch-space.

Reduced recomputation can be internal. A habit reduces the need for deliberation. Morphology reduces the need for active control. Immune memory reduces the need for first-exposure response. Neural weighting reduces the search space of perception and action.

Reduced recomputation can also be external. A road reduces route search. A sign reduces local uncertainty. A manual reduces procedural trial-and-error. A database reduces recall burden. A social norm reduces coordination search. A scientific instrument reduces unaided perceptual limitation.

This economy explains why passive intelligence is powerful.

It also explains why passive intelligence can fail.

If the inherited distinction no longer preserves the relation, then reduced recomputation becomes inherited error. A bad map misroutes. A broken instrument misleads. A miscalibrated standard propagates error. A harmful habit narrows branch-space badly. A defective rule misclassifies cases. A biased model applies prior made distinction in a way that fails under new conditions.

Passive intelligence therefore depends on the continuing validity of active information under the present RRP.

5.4. Internal and external reuse of made distinction

Passive intelligence may be internal or external.

Internal passive intelligence occurs when a locus reuses made distinction carried inside its own organisation.

Biological morphology is a primary case. A body does not recompute the entire evolutionary and developmental history that produced its form. Its structure carries prior made distinction. The arrangement of limbs, sensors, immune pathways, vascular systems, neural circuits, metabolic pathways, and regulatory thresholds alters present branch-space.

Habit is another case. A learned action pattern carries prior distinctions into present action. The body does not solve the task from scratch each time. It reuses stabilised distinction to guide movement, attention, avoidance, or response.

Immune memory is another case. Prior antigenic distinction alters later response. The system reuses retained biological distinction without re-entering the first-exposure condition.

External passive intelligence occurs when a locus reuses made distinction carried outside itself.

Tools, maps, signs, roads, archives, measurement standards, diagrams, language, protocols, rules, institutions, and databases all externalise made distinction. A locus can use these structures to alter downstream trajectory selection without internally carrying every relevant distinction.

In practice, internal and external passive intelligence often couple.

A person uses bodily habit to read a map. A scientist uses trained perception, instrument calibration, prior theory, written records, and institutional protocols. A machine uses stored parameters, external input, networked tools, and software architecture. An institution uses documents, roles, legal categories, databases, precedents, and trained personnel.

The intelligence claim must identify the locus and pathway.

If the locus is the person, the map may be external active information reused by the person. If the locus is the person-map coupling, the passive intelligence may belong to the coupled arrangement. If the locus is the institution, records and procedures may be internal to the institutional regime even if physically distributed.

Internal and external are therefore not absolute.

They depend on the RRP under which the locus is drawn.

5.5. Failure of passive intelligence

Passive intelligence can fail in several ways.

It can fail by unavailability. The active information exists but does not reach the locus. A map is lost. A record is inaccessible. A sign is hidden. A parameter is bypassed. A rule is unknown to the relevant procedure.

It can fail by unreadability. The locus encounters the form but cannot class it. A sign is in an unknown language. A map uses an unfamiliar convention. A code cannot be parsed. A record lacks metadata. A biological signal reaches a pathway that cannot bind or interpret it.

It can fail by misfit. The made distinction was valid under one regime but not another. A map is outdated. A rule applies to the wrong case. A habit formed in one context fails in another. A model trained under one distribution misclassifies under shift. A measurement standard is transferred beyond its domain.

It can fail by degradation. The active information decays. A sign erodes. A memory distorts. A record corrupts. A road collapses. A parameter drifts. An institution loses procedural integrity.

It can fail by over-reliance. Reduced recomputation suppresses current discrimination. The locus follows inherited distinction when present conditions require fresh application. A person follows a bad rule. An institution applies a category mechanically. A machine overfits. A body repeats a maladaptive habit.

These failures are important because passive intelligence often appears reliable precisely when it hides its own provenance.

The locus experiences the prior distinction as given.

But made distinction remains fallible.

Passive intelligence is powerful because it imports prior discrimination.

It is dangerous when the imported distinction no longer preserves the relevant relation.

5.6. Operational test for passive intelligence

The operational test for passive intelligence asks:

Does reuse of prior made distinction alter downstream trajectory selection for the locus under the stated conditions?

The test has three parts.

First, identify the active information. What made distinction is being reused? Is it a map, rule, habit, tool, parameter, record, sign, institution, morphology, calibration, or protocol?

Second, identify the uptake pathway. How does the locus access, class, and use the made distinction? What interface and abstraction regime make the form available?

Third, identify the downstream dependence. What changes in branch-space because the made distinction is reused?

The comparator then asks what happens when the active information is absent, unreadable, degraded, scrambled, misclassified, bypassed, or replaced.

If downstream trajectory selection remains unchanged, the passive intelligence claim weakens.

If downstream trajectory selection changes in the expected way, the claim strengthens.

A traveller with and without a map. A machine with and without stored parameters. An institution with and without a rule. A body with and without a habit. A cell with and without immune memory. An instrument with and without calibration. These comparisons reveal whether prior made distinction is doing present work.

Passive intelligence is therefore not inferred from the existence of active information.

It is established by reuse.

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6. Active Intelligence

6.1. Active intelligence as current application

Active intelligence is current application of distinction-conditioned organisation.

It occurs when a locus presently discriminates, searches, regulates, repairs, inhibits, reallocates, recalibrates, models, classifies, predicts, controls, or otherwise alters downstream trajectory selection by applying distinction.

Active intelligence may draw on passive information, active information, passive intelligence, and retained knowledge. But its defining feature is current branch-space alteration.

A cell sensing damage and initiating repair is actively intelligent in the relevant minimal sense if downstream trajectory selection depends on the damage distinction through localisable organisation. A machine classifying input is actively intelligent where output depends on applied token distinctions through the system’s architecture. A person solving a problem is actively intelligent where distinctions over goal, constraint, memory, possibility, and feedback alter action. An institution deciding a case is actively intelligent where records, rules, categories, and procedures are applied to produce differential outcomes.

Active intelligence is not necessarily better than passive intelligence.

It is different.

Passive intelligence reuses prior made distinction.

Active intelligence applies distinction in the present episode.

In strong systems, the two are entangled. A scientist actively redesigns an experiment using passive intelligence from instruments, mathematics, archives, and methods. A person actively

navigates using road systems, maps, signs, memory, and bodily habit. An institution actively classifies a case using prior records, rules, categories, and procedures. A machine actively produces output using trained parameters and current input.

The point is not to isolate pure forms.

The point is to preserve the status distinctions.

6.2. Search

Search is a primary mode of active intelligence.

Search occurs when a locus explores branch-space under distinction-conditioned organisation.

The search may be physical, chemical, behavioural, cognitive, computational, institutional, or scientific. A cell may search local chemical space by altering movement. A slime mold may search nutrient pathways by extending, retracting, and reinforcing. An animal may search terrain. A person may search memory, environment, or solution-space. A computer may search a state-space. A laboratory may search experimental parameter-space. An institution may search case records or policy alternatives.

Search becomes intelligence-relevant when distinctions guide the exploration.

Without distinction, search is random drift, diffusion, or background dynamics. With applied distinction, the search becomes constrained, weighted, pruned, expanded, redirected, terminated, or stabilised by what has been registered, retained, sensed, modelled, or inferred.

Search may use passive information. A terrain feature guides exploration. A gradient biases movement. A visible landmark narrows route possibilities.

Search may use active information. A map, prior record, model, tool, protocol, or habit reduces the search burden.

Search may generate new knowledge. A selected branch produces a retained result.

Search may become recursive. A retained result alters later search.

The operational test is whether the search trajectory depends on distinction-conditioned organisation rather than on background dynamics alone.

6.3. Regulation, repair, and inhibition

Active intelligence is not only search. It also includes regulation, repair, and inhibition.

Regulation applies distinction to maintain a regime within viable or specified bounds. A cell regulates internal state by distinguishing nutrient, damage, waste, stress, concentration, energy, or signalling conditions. An organism regulates posture, temperature, attention, hunger, pain, threat, and action. A machine regulates output through feedback. An institution regulates procedure through categories, thresholds, sanctions, and permissions.

Repair applies distinction to restore or preserve functional organisation. Damage must be distinguished from ordinary variation. A repair pathway must select where to intervene, what to restore, what to ignore, and when to stop. Repair is intelligence-relevant where downstream maintenance depends on the applied distinction.

Inhibition is equally important.

Intelligence often appears not as action, but as prevention of action. A system inhibits a pathway, suppresses a response, blocks a harmful branch, refuses a classification, stops a process, withholds output, delays commitment, or prevents escalation.

Inhibition is not absence of intelligence.

It may be applied distinction in one of its strongest forms.

A cell inhibits replication under damage. An immune system suppresses self-reactive response. A nervous system inhibits impulse. A machine blocks unsafe execution. An institution refuses inadmissible evidence. A scientific method rejects unsupported inference. A legal process prevents arbitrary sanction.

In each case, intelligence appears as branch-space narrowing.

A trajectory that could have been realised is blocked because a distinction was applied.

This matters because intelligence is often over-associated with production: output, action, speech, movement, solution, novelty. But applied distinction may protect a regime by preventing inappropriate branch-realisation.

Intelligent non-action is still application where downstream trajectory selection depends on distinction.

6.4. Reallocation and recalibration

Active intelligence also includes reallocation and recalibration.

Reallocation occurs when a locus shifts resources, attention, energy, time, labour, pathway priority, computational allocation, institutional focus, or behavioural effort because of applied distinction.

A cell reallocates molecular resources under stress. An organism reallocates attention under threat. A person reallocates time after receiving information. A machine reallocates processing based on priority. An institution reallocates budget, enforcement, or personnel based on records, categories, and forecasts.

Recalibration occurs when a locus adjusts its own discrimination regime.

A sensor recalibrates after drift. A body adapts threshold after repeated stimulation. A person revises a category after error. A machine updates parameters. A laboratory adjusts an instrument. An institution revises procedure after failure. A scientific field changes measurement standards.

Recalibration is especially important because it shows intelligence acting not only on external branch-space, but on the conditions of future distinction.

A locus can apply distinction to alter its own OP, OA, OR, RAS, or RSD pathways. It can change what becomes available, how alternatives are classed, what gets registered, what is retained, and what is redeployed.

This creates recursive intelligence.

Past application produces retained distinction.

Retained distinction changes future application.

Future application changes the conditions of later distinction.

Such recursion is central to learning, adaptation, scientific method, technical development, institutional reform, and cumulative culture. It is not required for minimal intelligence, but it marks stronger forms.

6.5. Operational test for active intelligence

The operational test for active intelligence asks:

Does current distinction-conditioned organisation alter downstream trajectory selection under specified reference conditions?

The test requires:

a locus;

a distinction or distinction-bearing condition;

an organisational pathway that makes the distinction operative;

a downstream outcome class;

a comparator family capable of varying or disabling the proposed mediating organisation.

For minimal claims, the pathway may be simple. A threshold difference alters one transition. A damage marker triggers one repair process. A classified input changes one output.

For stronger claims, the pathway may be composite. Retained states, external tools, models, rules, memories, instruments, and institutions may combine in a multi-stage branch-selection regime.

In either case, the discriminator is dependence.

If changing the distinction changes the downstream trajectory, the active intelligence claim is supported.

If changing the distinction does not matter, the claim weakens.

If the outcome occurs by background dynamics, luck, brute physical constraint, external interpretation, or non-localised causal structure, the claim must be weakened or reframed.

Active intelligence is therefore not inferred from activity.

It is established by distinction-conditioned branch dependence.

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7. Knowledge, Intelligence, and Life

7.1. Knowledge without intelligence

Knowledge can exist without intelligence in the present episode.

A retained distinction may persist without being applied. A book may sit unread. A memory may remain inactive. A database entry may remain unqueried. A rule may remain unused. A stored parameter may remain bypassed. A fossil may preserve relation without being examined. A calibration record may exist without being applied.

These may be knowledge-bearing in the minimal record-present sense.

They are not intelligence in the present episode.

The difference is not value. It is status.

Knowledge asks whether distinction is retained.

Intelligence asks whether distinction is applied.

A retained distinction may later become intelligence-relevant. When a person reads the book, when a system queries the database, when a court applies the rule, when a scientist examines the fossil, when a machine uses the parameter, when an instrument applies calibration, the retained distinction enters application.

At that point, knowledge participates in intelligence.

But retention alone is not application.

This distinction keeps Paper 2 and Paper 3 from collapsing into one another.

7.2. Intelligence using inherited or external knowledge

Intelligence often uses inherited or external knowledge.

A locus need not have produced the distinctions it applies.

A person can use a map made by others. A scientist can use an instrument built by others. A child can use language inherited from a community. A citizen can use legal categories stabilised by an institution. A machine can use parameters produced by training. A doctor can use records produced by earlier clinicians. A laboratory can use standards produced elsewhere. A community can use roads, signs, buildings, and protocols inherited from prior generations.

This is not a defect. It is one of the major powers of intelligence.

Applied distinction can travel.

It can be retained outside the body.

It can be stabilised in tools.

It can be transmitted through language.

It can be institutionalised in procedures.

It can be formalised in mathematics.

It can be encoded in machines.

It can be embedded in environments.

The present locus applies distinctions whose provenance lies elsewhere.

That is why provenance and use must be separated.

A distinction may be made by one system, stored in another, transmitted through a third, and applied by a fourth. The production relation establishes active-information provenance. Storage and transmission preserve or carry the made distinction under their respective conditions. Application establishes present intelligence-status for the locus whose downstream trajectory selection is altered. The intelligence claim must identify which locus is being evaluated and what role the distinction plays in that locus’s downstream trajectory selection.

7.3. Provenance neutrality is not interface neutrality

Intelligence is provenance-neutral in one sense.

The distinction applied by a locus need not have been produced by that same locus. A traveller need not have made the signpost. A judge need not have written the law. A scientist need not have built the instrument. A user need not have trained the model. An organism need not have consciously designed its morphology.

But provenance neutrality is not interface neutrality.

The distinction must still become available to the locus.

It must be accessible through some interface. It must be classable under some abstraction regime. It must be usable at the relevant scale. It must persist over the relevant horizon. It must be connected to an organisational pathway capable of altering downstream trajectory selection.

A signpost does not help someone who cannot see it, read it, or incorporate it into route selection. A law does not guide a procedure that cannot recognise or enforce it. A model parameter does not matter if the system bypasses it. A tool does not alter branch-space if the user cannot handle it. A biological morphology does not support present action if the coupling to action is broken.

The origin of the distinction may lie in an earlier production RRP, and the producing locus may no longer exist. That production relation fixes active-information provenance.

Availability and application for the present intelligence claim must still be local to the current RRP.

This prevents external usefulness from being mistaken for intelligence. A structure may be useful in principle, admirable to an observer, or powerful in another system. But for the intelligence claim at hand, it must be applied by the locus under the specified conditions.

7.4. Life is stricter than intelligence

Life is stricter than intelligence.

The Part 1 life discriminator requires driven thermodynamic constraint-maintenance supported by IPL-mediated NTC. A living system must maintain a driven regime over an operational horizon through distinction-conditioned organisation.

Intelligence, by contrast, requires applied distinction altering downstream trajectory selection.

The two are related but not identical.

Living systems often exhibit intelligence. Cells regulate, repair, inhibit, adapt, and reallocate. Organisms search, learn, navigate, communicate, and plan. Immune systems retain and apply distinction. Nervous systems integrate perception, memory, and action. Social organisms externalise distinction into tools, signs, norms, and institutions.

But intelligence is not sufficient for life.

A machine system may apply distinctions without being alive. An institution may apply rules without being a living organism. A tool-supported process may alter branch-space without maintaining its own driven thermodynamic regime. A computational system may instantiate NTI without satisfying the life discriminator. A legal procedure may exhibit institutional applied distinction without being a living system.

Life also is not reducible to intelligence.

A living system may be minimal. It may apply distinctions in maintenance without cognition, deliberation, symbolic thought, or flexible problem-solving. The life question asks whether driven thermodynamic constraint-maintenance is supported by IPL-mediated NTC. The intelligence question asks whether distinction is applied to downstream trajectory selection.

Overlap is common.

Identity is false.

7.5. Intelligence outside life

Intelligence can occur outside life where distinction-conditioned organisation alters downstream trajectory selection without satisfying the life discriminator.

A technical system may classify, route, regulate, optimise, or control. A scientific instrument may apply calibration and measurement protocols inside a larger experimental arrangement. A legal institution may classify cases and alter outcomes. A market system may process price distinctions into allocation. A traffic system may apply signals, sensors, and rules to movement. A computational model may apply learned parameters to produce output. A tool-user coupling may apply externalised distinction without the tool itself being alive.

These cases require care.

The intelligence claim must not drift into the whole environment. It must identify the locus, interface, applied distinction, organisational pathway, downstream trajectory, and comparator condition.

A calculator is not intelligent merely because a human uses it in intelligent activity. A road is not intelligent merely because traffic flows along it. A law is not intelligent merely because it exists. A trained model is not intelligent merely because parameters are stored. An institution is not intelligent merely because outcomes occur.

The claim becomes stronger where the distinction-conditioned organisation of the artefact, system, or institution can be shown to alter downstream trajectory selection under comparator discipline.

Intelligence outside life is therefore possible.

It is not automatic.

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8. Guardrails and failure modes

8.1. Intelligence is not cognition

Failure mode: intelligence is restricted to consciousness, reasoning, language, self-awareness, symbolic thought, or human-like cognition.

Correction: cognition is one powerful architecture of intelligence. It is not the minimal condition. Intelligence begins where distinction-conditioned organisation is applied to downstream trajectory selection for a locus.

No cognition requirement.

But also no cognition shortcut.

Human-like appearance does not establish applied distinction.

8.2. Intelligence is not usefulness

Failure mode: every useful, consequential, or outcome-shaping structure is called intelligent.

Correction: usefulness is broader than intelligence. Mountains, rivers, stars, caves, gradients, and physical regularities may shape branch-space. They become intelligence-relevant only where a locus applies their distinctions.

No application by a locus, no intelligence-status.

8.3. Intelligence is not information

Failure mode: available distinction is treated as intelligence.

Correction: information may be available without being applied. OP-supported distinction may shape possible branch-space, but intelligence requires application in downstream trajectory selection.

Within the inherited RRP architecture, information for a locus is operational distinction under specified reference conditions.

Intelligence is applied distinction.

8.4. Intelligence is not knowledge

Failure mode: retained distinction is treated as intelligence merely because it persists.

Correction: knowledge is retained distinction. Intelligence is applied distinction. A retained state may remain unused. It becomes intelligence-relevant only where it alters downstream trajectory selection.

No application, no intelligence-status.

8.5. Intelligence is not life

Failure mode: applied distinction is treated as life.

Correction: life requires driven thermodynamic constraint-maintenance supported by IPL-mediated NTC. Intelligence may occur inside life, support life, or appear outside life. It is not sufficient for life-status.

No driven thermodynamic constraint-maintenance, no life-status.

8.6. Passive information is not passive intelligence

Failure mode: found distinction is called passive intelligence because it is useful.

Correction: passive information is found distinction. Passive intelligence is made distinction reused. A mountain, river, star, gradient, or cave may supply passive information. It becomes

intelligence-relevant only when a locus applies or reuses distinction in downstream trajectory selection.

Found distinction alone is not intelligence.

8.7. Active information is not active intelligence

Failure mode: made distinction is called active intelligence because prior organisation produced it.

Correction: active information is made distinction whose provenance is fixed by a producing locus through prior distinction-conditioned organisation. It does not require present use or the continued existence of that producing locus. It becomes intelligence only where it is currently reused or applied by the same or another locus so that downstream trajectory selection changes under the stated reference conditions. A map, rule, sign, tool, road, archive, standard, or parameter may carry prior applied organisation while remaining unused in the present episode.

Production provenance is not present application. Later encounter does not create made provenance.

8.8. Passive intelligence is not inactivity

Failure mode: passive intelligence is read as non-operative or dormant.

Correction: passive intelligence is current reuse of prior made distinction. It is passive relative to the original selection problem, not passive relative to present branch selection.

Reuse is application.

Dormant active information is not passive intelligence.

8.9. Success is not intelligence

Failure mode: a process is called intelligent because it succeeds.

Correction: success may arise from luck, background dynamics, brute constraint, external support, or environmental regularity. Strong intelligence claims require downstream dependence on applied distinction-conditioned organisation under comparator discipline.[6]

No comparator-stable distinction dependence, no strong intelligence claim.

8.10. External usefulness is not intelligence

Failure mode: an external observer’s use or admiration of a structure is projected onto the structure itself.

Correction: the distinction must be available and operative at the relevant RRP. A structure may be useful to an observer, analyst, or later user without being intelligent as the locus under evaluation.

Do not move the locus silently.

Do not let external interpretation do the work.

9. Handoff to Observation

9.1. What Paper 3 has installed

This paper has installed the intelligence facet of the Part 2 architecture.

Paper 1 established that, within the RRP architecture, information for a locus is physical difference made relationally available as operational distinction under specified reference conditions.

Paper 1a established signal as preserved contrast.

Paper 2 established knowledge as retained distinction.

Paper 3 has now established intelligence as applied distinction.

The paper has defined intelligence as the application of distinction-conditioned organisation to alter downstream trajectory selection for a locus under specified reference boundary, reference scale, operational horizon, discrimination/noise regime, and comparator discipline.

It has also installed the provenance/use ladder:

Passive information is found distinction.

Active information is made distinction.

Passive intelligence is made distinction reused.

Active intelligence is distinction currently applied.

This ladder allows the series to distinguish found constraint, made form, inherited reuse, and current application without collapsing them into one another.

Active-information provenance is fixed by the producing locus; passive- or active-intelligence status is fixed by the present application relation at the evaluated locus.

9.2. What remains unresolved

The paper has not yet defined observation.

Application is not the same as observation.

A system may apply distinction without producing a retained observational record in the relevant sense. A pathway may regulate without a record. A habit may guide action without explicit observation. A tool may be used without the user registering the tool's own formation. A machine may apply a parameter without observing in the stronger record-provenance sense. An institution may apply a rule while leaving some underlying relation unobserved.

Observation asks a different question.

What does it mean for a difference to be registered through a bounded interface into retained record?

When is an OP-supported alternative selected through OR into an OA-keyed RAS?

When does a record become deployable?

When does redeployed record produce comparator-stable downstream dependence?

These are not intelligence questions alone. They concern the registration and record-provenance facet of the same architecture.

Intelligence emphasises application.

Observation emphasises bounded registration.

9.3. Handoff to Observation

The sequence now has four controlled positions.

Within the inherited RRP architecture, information for a locus is operational distinction under specified reference conditions.

Signal is preserved contrast.

Knowledge is retained distinction.

Intelligence is applied distinction.

The next paper asks what happens when distinction is registered as a bounded record.

That is observation.

Observation must not be treated as a certificate, a privileged warrant, or unmediated access to reality. The same relational access principle remains in force. A finite locus does not possess reality as total state. It encounters reality through boundary, interface, channel, threshold, scale, abstraction, registration, retention, and possible redeployment.

Observation will therefore be defined not as possession of the world, but as bounded registration of relation.

The observation event is OR.

The observation record is RAS.

Strong observation requires RSD.

Paper 4 will translate the inherited stack into the observation facet and distinguish record-presence, grounded deployability, and realised record-operativity.

9.4. Final compression

The final position of this paper is:

Intelligence is applied distinction.

It is broader than cognition.

It is narrower than usefulness.

It is not information merely available.

It is not knowledge merely retained.

It is not life merely because it alters branch-space.

It is the application of distinction-conditioned organisation to downstream trajectory selection for a locus under specified reference conditions.

Passive information is found distinction.

Active information is made distinction.

Its active status is fixed by the producing locus and does not depend on present use, later encounter, or the producer's continued existence while the relevant made distinction remains instantiated.

Passive intelligence is made distinction reused.

Active intelligence is distinction currently applied.

Non-Trivial Intelligence is NTC under the intelligence facet.

A locus need not produce every distinction it applies.

But the distinction must become available and operative at the relevant RRP.

Provenance may be external.

Application must be localisable.

The next question is not whether distinction can be applied.

It is whether distinction can be registered as bounded record.

That question is observation.

Endnotes

[1] Comparator: Marc van Duijn, Fred Keijzer, and Daan Franken, "Principles of Minimal Cognition: Casting Cognition as Sensorimotor Coordination" (2006), places minimal cognition in biologically embodied sensorimotor coordination serving autopoietic organisation. The present paper shares the anti-anthropocentric pressure but sets a different lower threshold: applied distinction need not be biological, autopoietic, or cognitional. No cognitive or autopoietic machinery is inherited.

[2] Comparator: Edwin Hutchins, Cognition in the Wild (1995), moves the relevant cognitive unit of analysis beyond the individual in culturally organised systems such as navigation teams. The present paper shares the need to draw the operative locus at the level where the relation is realised, including coupled and distributed arrangements, but locus-status here does not by itself attribute cognition or mind.

[3] Historical/structural comparator: W. Ross Ashby, An Introduction to Cybernetics (1956), develops regulation, control, and variety across biological and mechanical systems. The present paper shares the concern with finite alternatives and regulated outcome differentiation, but intelligence-status here requires a specified distinction to be applied by a locus so that downstream trajectory selection depends on it. Regulation or control alone is not sufficient, and no cybernetic formalism is inherited as a dependency.

[4] Terminological provenance: David Bohm and Basil J. Hiley, The Undivided Universe (1993), use "active information" within their ontological interpretation of quantum theory. The present paper uses the same phrase in a different technical sense: made distinction whose provenance is fixed by a producing locus through prior distinction-conditioned organisation. No Bohmian quantum mechanism or ontology is inherited.

[5] Comparator: Guy Theraulaz and Eric Bonabeau, "A Brief History of Stigmergy" (1999), reviews indirect coordination in which traces or changes left by prior activity alter the environment and guide subsequent activity. This is a restricted-domain neighbour to external made distinction being reused. The present paper generalises beyond stigmergic coordination and separately requires producing-locus provenance and present locus-relative application before passive-intelligence status is assigned.

[6] Opposing comparator: Shane Legg and Marcus Hutter, "Universal Intelligence: A Definition of Machine Intelligence" (2007), formalises machine intelligence in terms of expected goal-achievement performance across environments. The present paper uses a different discriminator: success or goal achievement does not establish strong intelligence absent comparator-stable downstream dependence on applied distinction-conditioned organisation. No universal-prior, reward, or agent formalism is inherited.

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