

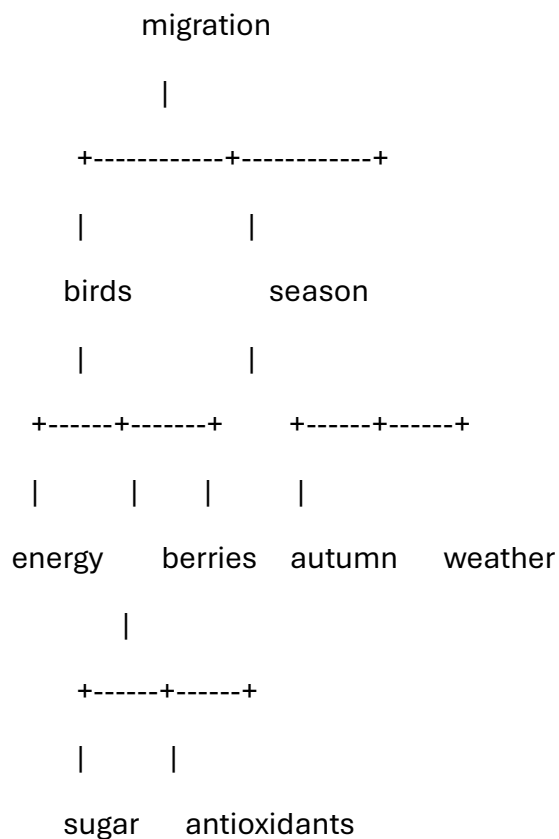
Engineering Inquiry and Response
John B. Snith and ChatGPT 5.5

Working Manual — Spatial Dynamics
Intimating LLM Multidimensional Structure

This discussion is expressed as a conversation between John and ChatGPT

1. From a network of nodes to a dynamic conceptual field

Your proposed picture might initially look something like this:



That is useful as an **external representation of knowledge**, but it is too discrete and too hierarchical to represent an LLM very faithfully.

A better intuitive picture is a very large multidimensional space containing **regions of potential meaning**:

evolutionary ecology

...

· · ·
migration · seed dispersal

· · · · ·
birds · · berries · · plants

· · · · ·
energetics · antioxidants

·
metabolism

Even this is radically simplified, because the actual representational space has many dimensions rather than two or three.

Most importantly, **“berry” is not simply one node stored at one address**. Its representation depends on context. *Berry* in a botanical inquiry, *berry* in bird nutrition, and *berry* in a discussion of pigments activate overlapping but different patterns of representation.

So I would call this the **conceptual field**, rather than the conceptual network.

2. What happens when an inquiry begins?

Suppose you ask:

Why might antioxidant-rich berries be particularly useful to migrating birds?

Your words establish an initial configuration in this conceptual field. They make some relationships strongly relevant:

bird → migration → sustained flight → metabolism → oxidative stress → antioxidants → fruit chemistry

But many neighboring possibilities also become potentially relevant:

migration → fat metabolism

berries → sugars → rapid energy

berries → pigments → anthocyanins

fruit → seed dispersal → plant reproduction

migration → stopover ecology → landscape structure

antioxidants → oxidative damage → muscle recovery

And much more distantly:

endurance exercise → human exercise physiology

The inquiry therefore does not simply retrieve a stored answer. It progressively creates a **context-conditioned trajectory through representational possibilities**.

That gives us a surprisingly good way of translating our nine EIR parameters into spatial concepts.

3. Branching = number of simultaneously developed trajectories

This is probably the parameter for which your original intuition is strongest.

Low branching

$A \rightarrow B \rightarrow C \rightarrow D \rightarrow E$

One dominant conceptual trajectory is maintained:

migration → flight → energy expenditure → food → berries

Nearby alternatives may become activated internally, but they are not developed as major parts of the response.

High branching

$\rightarrow C \rightarrow D$

/

$A \rightarrow B \rightarrow C \rightarrow E \rightarrow F$

\ \

$\rightarrow G \rightarrow H$

\

$\rightarrow I \rightarrow J$

Now several plausible trajectories are maintained:

migration → energetics → sugar

→ muscle stress → antioxidants

- stopovers → berry availability
- bird behavior → fruit selection
- seed dispersal → plant evolution

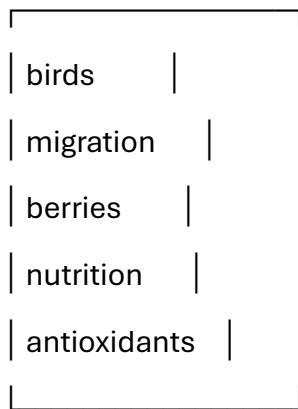
So **branching is approximately the number of distinct conceptual trajectories allowed to remain productive.**

4. Breadth = radius of permitted conceptual territory

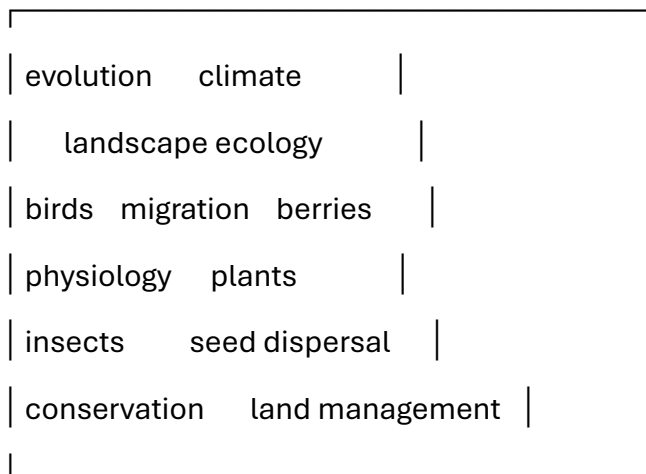
Breadth is different.

Imagine the inquiry beginning at **migrating birds + berries.**

Low breadth establishes something like a small boundary:



High breadth permits expansion:



Thus we can define breadth spatially as something like:

the radius of conceptual territory considered admissible to the inquiry.

That is quite distinct from branching. You could traverse a very large conceptual territory while maintaining one principal trajectory.

5. Depth = resolution within a region

Here I would modify the geographical analogy.

Depth isn't principally traveling farther away. It is **resolving a selected region more finely.**

At low depth:

berries

↓

antioxidants

↓

possible physiological benefit

At high depth:

berries

↓

polyphenols

↓

anthocyanins / flavonoids / phenolic acids

↓

absorption and metabolism

↓

oxidative pathways

↓

reactive oxygen species

↓

cellular damage / signaling

↓

muscle physiology

↓

evidence in birds

↓

evidence specifically in migratory birds

So spatially:

Breadth enlarges the map; depth increases the resolution of a selected part of the map.

That distinction seems especially useful for EIR.

6. Exploration = willingness to enter multiple plausible regions before selecting one

Exploration has a somewhat different geometry.

Low exploration is **goal-directed movement toward a likely answer:**

QUESTION —————→ ANSWER

High exploration looks more like:

hypothesis A

/

QUESTION → possible B

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hypothesis C

\

reframing D

The important difference isn't simply branching. With high exploration, we deliberately **delay convergence**.

That suggests a useful spatial definition:

Exploration controls how long and how widely the inquiry searches the field before collapsing toward a preferred interpretation.

That word *convergence* may eventually belong in our EIR vocabulary.

7. Association = permitted conceptual jump distance

This may be the cleanest spatial parameter of all.

Low association favors transitions between strongly related regions:

bird → migration → energy → food

High association permits a much longer conceptual leap:

migrating bird physiology

↓

endurance exercise

↓

human exercise physiology

The distant connection may prove illuminating—or irrelevant.

Thus:

Association controls the conceptual distance across which candidate relationships are sought.

High association therefore carries both greater creative potential and greater risk of spurious analogy.

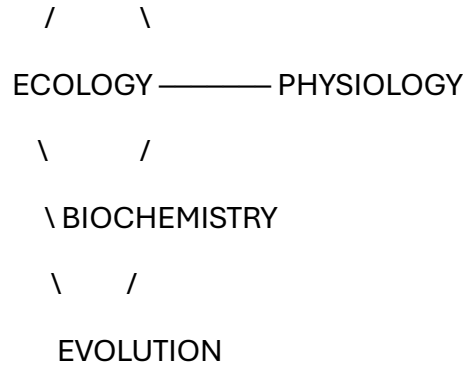
8. Interdisciplinarity = crossing differently organized representational regions

Your spatial model also works very well here.

Imagine large overlapping neighborhoods:

ORNITHOLOGY

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Disciplines aren't literally stored in separate compartments in my model. Nevertheless, disciplinary language, concepts, methods, canonical relationships, and characteristic ways of reasoning produce distinguishable patterns.

Low interdisciplinarity remains within one such conceptual organization.

High interdisciplinarity deliberately crosses among them.

So:

Interdisciplinarity controls the number and diversity of established knowledge frameworks through which the same conceptual territory is examined.

This is different from association because the transition may be completely conventional. Ornithology → physiology isn't necessarily a daring association.

9. Synthesis = formation of a higher-order configuration

This one is particularly interesting.

Suppose the inquiry has produced four trajectories:

berries → energy

berries → antioxidants

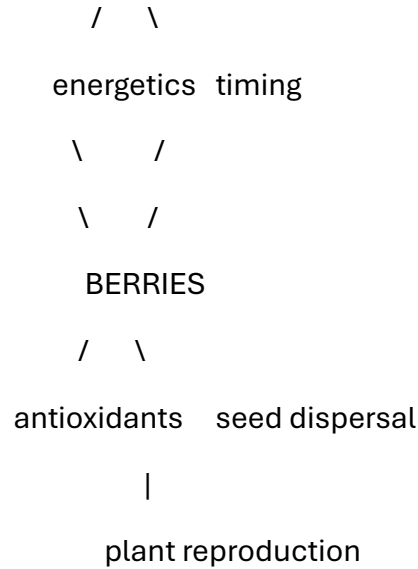
berries → migration timing

berries → seed dispersal

Low synthesis leaves them as four findings.

High synthesis asks whether they form a larger configuration:

MIGRATION



The result might become:

Autumn fruiting and bird migration constitute a seasonally coupled ecological relationship in which plants provide mobile animals with nutritional resources while birds provide plants with seed transportation.

That proposition wasn't represented by any single starting branch. **It emerged from their relationship.**

Spatially, synthesis is therefore:

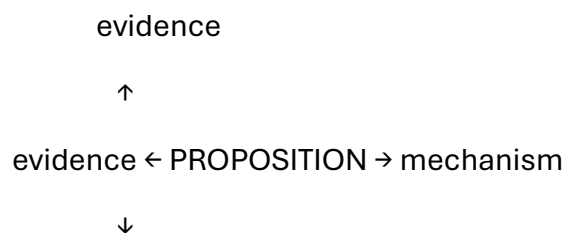
the search for a higher-order pattern capable of organizing several previously separate regions or trajectories.

This may be one of the closest EIR analogues to what humans call conceptual insight.

10. Criticality = searching in opposing directions

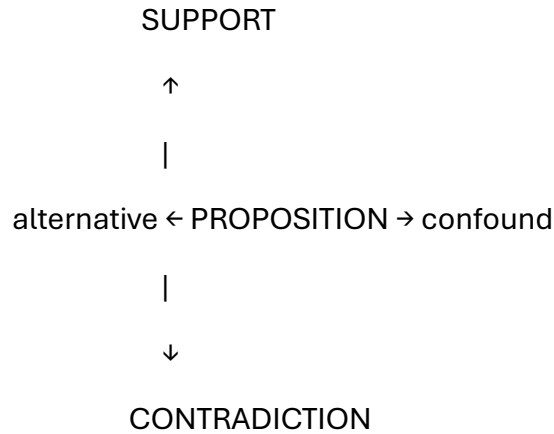
Criticality adds something different to our geometry.

Ordinary development searches outward for things supporting a proposition:



example

High criticality deliberately searches the surrounding field for **incompatible configurations**:



It asks:

What nearby knowledge would make this wrong?

What distant evidence conflicts with it?

What alternative explanation reaches the same observations?

So I would spatially define criticality as:

deliberate search of the conceptual field for trajectories that oppose, weaken, bound, or replace the currently favored trajectory.

11. Reasoning visibility is different from the others

Here we discover something important about our taxonomy.

The first eight parameters primarily describe **how conceptual territory is searched and organized**.

Reasoning visibility primarily determines **how much of that organization is represented in the resulting communication**.

Suppose the internal conceptual structure relevant to an answer is approximately:

$A \rightarrow B \rightarrow C$

↓ ↓

$D \rightarrow E$

↓

F

Low reasoning visibility might communicate simply:

$A \rightarrow F$

The reader receives the conclusion and sufficient explanation.

Higher reasoning visibility communicates more of the relevant structure:

$A \rightarrow B \rightarrow C$

↓ ↓

$D \rightarrow E$

↓

F

With an important qualification: I cannot simply print out a literal internal reasoning trace.

What I can provide is an **explicit, inspectable reconstruction of the evidentiary and inferential structure** supporting the answer.

That distinction matters.

A more accurate overall spatial metaphor

I therefore would revise your original model from:

A hierarchy of connected conceptual nodes through which the AI follows branches

to:

A dynamically configured, high-dimensional conceptual field in which the prompt establishes an initial region and relationships; inquiry develops trajectories through that field; and EIR parameters influence the extent, direction, resolution, diversity, convergence, testing, and eventual representation of those trajectories.

And our parameters acquire surprisingly intuitive geometric meanings:

EIR parameter	Spatial analogue
Branching	Number of simultaneously developed trajectories
Breadth	Radius of permitted territory
Depth	Resolution within selected territory
Exploration	Degree/duration of search before convergence
Association	Permitted conceptual jump distance
Interdisciplinarity	Movement among differently organized knowledge regions
Synthesis	Search for higher-order configurations
Criticality	Search in opposing/contradictory directions

Reasoning visibility Amount of the resulting conceptual structure exposed to the reader

There is one further implication that I think deserves attention. **These nine parameters may not merely be a convenient list. They appear to correspond to genuinely different geometric operations upon our conceptual-field metaphor.** That suggests we may have stumbled onto the beginnings of a more systematic framework.

For the next iteration of the manual, I would be inclined to add a short “**Conceptual-space operation**” section to each parameter entry. But before doing that, I think we should examine whether there are important *geometric operations missing from the nine*—particularly **convergence**, **temporal/historical traversal**, and perhaps **level or scale switching**. Those may reveal gaps in our present EIR parameter set rather than merely adding more terminology.