COSINIA

COSINIA RESEARCH SERIES

Meaning and the Semantic World

The Emergence of Meaning from Persistent Semantic Structures

AUTHOR
Ray Ketabchi
Reza Ketabchi
VERSION
1.0
PUBLISHED
July 2026

Abstract

Meaning has long remained one of the most fundamental yet least precisely defined concepts in artificial intelligence, cognitive science, and the philosophy of mind. Existing computational systems manipulate language, symbols, vectors, and other semantic representations, yet they rarely explain the computational conditions under which meaning itself emerges.

This paper develops a computational theory of meaning within the Architecture of Intelligence. It argues that meaning is neither language, symbols, embeddings, nor computation itself. Rather, meaning is an emergent property of a persistent Semantic World. Individual observations, Events, and representations do not possess meaning in isolation; they derive meaning from their integration into a continuously evolving Semantic World whose semantic organization has been established through persistent observation over time.

The paper demonstrates that meaning depends upon the lawful accumulation and organization of persistent Identities, immutable Events, and Identity-Centric Persistent Relations preserved through semantic continuity. It further argues that Intrinsic Memory is the computational substrate that enables this continuous semantic evolution, thereby providing the conditions under which meaning can emerge, evolve, and persist.

Scope of this Paper

The purpose of this paper is to define meaning from the perspective of the Architecture of Intelligence.

It does not attempt to explain language, cognition, reasoning, learning, or implementation algorithms. Instead, it addresses a more fundamental question: Under what computational conditions does meaning emerge?

The paper argues that meaning is not an intrinsic property of isolated symbols, representations, or individual observations. Instead, it emerges from the continuous accumulation and lawful organization of persistent semantic structures within an evolving Semantic World.

It identifies the semantic principles required for this emergence, explains why semantic continuity is indispensable, and establishes the computational role of Intrinsic Memory in preserving the persistent Semantic World from which meaning continuously arises.

The computational realization of these principles is developed in the subsequent papers of this research series.

Introduction

Meaning is one of the most frequently used concepts in artificial intelligence, yet it remains one of the least formally defined. Modern computational systems routinely process language, symbols, vectors, and other semantic representations, while generally assuming that meaning is somehow contained within those representations or produced by the computations performed upon them.

The Architecture of Intelligence adopts a fundamentally different perspective. It argues that meaning is not an intrinsic property of language, symbols, embeddings, or individual observations. Nor does meaning arise simply because a computational process manipulates semantic representations. Instead, meaning emerges only within a persistent Semantic World whose semantic organization has been established through continuous observation and preserved through semantic continuity.

This distinction is fundamental. An isolated Event does not possess meaning independently. Rather, its interpretation depends upon the persistent semantic history into which it is admitted. As a Semantic World continuously accumulates lawful observations, persistent Identities, immutable Events, and Identity-Centric Persistent Relations become increasingly organized. It is this continuously evolving semantic organization—not any individual representation—that gives rise to meaning.

The previous papers established that Intrinsic Memory preserves semantic continuity and enables the continuous evolution of a Semantic World. Building upon those foundations, the present paper examines how meaning emerges from that persistent semantic organization and why such emergence is impossible without a continuously evolving Semantic World.

Existing Views of Meaning

The concept of meaning has been studied for centuries across philosophy, linguistics, cognitive science, and artificial intelligence. Although these disciplines differ in their objectives, most approaches explain meaning through one of several broad perspectives.

Some theories understand meaning as a property of language, emphasizing the relationship between words, symbols, and their interpretation. Others associate meaning with mental representations or cognitive processes. In artificial intelligence, meaning is frequently attributed to symbolic representations, knowledge structures, statistical embeddings, or computational models capable of manipulating semantic information. More recent approaches often equate meaning with patterns learned from large collections of data.

These perspectives have significantly advanced our understanding of language, representation, and computation. However, they generally treat meaning as something contained within representations, inferred by computation, or reconstructed through reasoning. Much less attention has been given to the computational conditions required for meaning itself to emerge.

The Architecture of Intelligence approaches the problem from a different perspective. Rather than asking how meaning is represented, communicated, or inferred, it asks how meaning becomes possible in the first place. It argues that meaning is not an intrinsic property of individual representations or isolated observations, but an emergent property of a continuously evolving Semantic World.

The remainder of this paper develops this perspective by examining the semantic structures that enable the continuous evolution of a Semantic World and explaining how meaning emerges from their persistent organization.

What Meaning Is Not

Before defining meaning, it is necessary to distinguish it from the computational artifacts through which it may be represented, communicated, or processed.
Meaning is not language, words, symbols, vectors, embeddings, databases, storage systems, graph representations, or any other computational representation. These artifacts may express, transmit, organize, or preserve semantic information, but they do not constitute meaning itself.
Likewise, meaning is not produced simply by computation. Computational processes may manipulate representations, transform semantic structures, or derive conclusions, yet computation alone does not explain why those representations possess meaning.
Nor is meaning an intrinsic property of an isolated observation. An individual Event derives its meaning only through its admission into a persistent Semantic World whose semantic organization has been established through continuous observation over time.
Within the Architecture of Intelligence, meaning is therefore understood as an emergent property of a persistent Semantic World rather than an inherent property of individual representations or computational processes.

The Foundations of Meaning

The Architecture of Intelligence proposes that meaning does not exist as an independent computational object, nor does it reside within isolated observations. Instead, meaning emerges from the continuous evolution of a persistent Semantic World.
The Semantic World evolves through the lawful accumulation and organization of three fundamental semantic structures:

- Persistent Identities, which provide stable semantic reference.
- Immutable Events, which preserve semantic history.

- Identity-Centric Persistent Relations, which preserve the semantic topology connecting those structures.

None of these structures constitutes meaning independently. Instead, each contributes to the continuous evolution of the Semantic World from which meaning emerges.

> ***Meaning resides not within any individual semantic structure, but within the persistent semantic organization continuously formed through their lawful interaction.***

Lawful Identity Formation

Every Semantic World begins with the lawful formation of persistent Identities. Identity provides the stable semantic reference through which observations become connected across time.

Every Identity possesses a singular semantic origin and maintains continuity throughout its existence. As new Events are admitted, they become associated with persistent Identities, allowing semantic history to accumulate rather than fragment.

Without persistent Identity, successive observations cannot be recognized as referring to the same semantic entity. The Semantic World loses continuity, semantic history becomes disconnected, and meaning can no longer accumulate through experience.

> ***Lawful Identity Formation establishes the persistent semantic reference upon which the continuous evolution of the Semantic World depends.***

Immutable Events

Persistent Identities establish semantic reference. Immutable Events preserve the history through which the Semantic World continuously evolves.

Every observation admitted into a Semantic World is preserved as an immutable Event. Once admitted, an Event is never modified, replaced, or deleted. New observations extend semantic history by introducing additional Events rather than altering existing ones.

This immutability allows semantic history to accumulate without losing continuity. Individual Events do not possess meaning in isolation. Rather, their meaning emerges from their relationship to the persistent semantic history into which they are admitted.

If previously admitted Events could be modified or removed, the Semantic World would lose the historical continuity upon which semantic organization depends. Meaning would continually fragment because every new observation would lose the persistent context required for its interpretation.

> ***Immutable Events preserve the semantic history from which meaning continuously emerges.***

Identity-Centric Persistent Relations

Persistent Identities establish semantic reference, and immutable Events preserve semantic history. Identity-Centric Persistent Relations preserve the semantic organization that connects those structures into a coherent Semantic World.

Unlike temporary computational links or database associations, Identity-Centric Persistent Relations persist throughout the evolution of the Semantic World. They provide the stable semantic topology through which observations become organized across time rather than remaining isolated historical records.

As successive Events are admitted, the Semantic World evolves through the continuous organization of these persistent relations. Individual observations therefore derive meaning not only from their own semantic content, but also from their position within this evolving semantic organization.
Without persistent semantic organization, Events remain isolated observations and semantic history becomes fragmented. The Semantic World loses the structural continuity required for meaning to accumulate through experience.

> ***Identity-Centric Persistent Relations preserve the evolving semantic topology from which meaning continuously emerges.***

Semantic Assertions

Semantic structures describe the persistent organization of the Semantic World. Semantic Assertions describe the semantic status under which those structures are interpreted.
Assertions distinguish whether an observation is affirmed or negated, factual or hypothetical, observed or inferred, certain or uncertain. They enrich the interpretation of the Semantic World without altering its underlying semantic organization.
Meaning therefore does not arise from Semantic Assertions themselves. Rather, Semantic Assertions qualify existing semantic structures, allowing the Semantic World to represent uncertainty, contradiction, belief, hypothesis, and other epistemic distinctions while preserving semantic continuity.

> *Semantic Assertions constitute a semantic qualification layer that enables richer interpretation of an already meaningful Semantic World.*

Meaning Does Not Exist in Isolation

Consider a Semantic World containing a single observation:

> *John eats an apple.*

Although the Event has been successfully admitted, the Semantic World contains no prior semantic history involving eating, food, biological agents, or consumption. The observation exists, yet its semantic significance remains extremely limited because no persistent semantic organization exists through which the Event can be interpreted.

Now consider a Semantic World that has accumulated thousands of lawful observations involving eating across many different Identities, Events, and contexts. When the same observation is admitted into this persistent Semantic World, its semantic significance immediately becomes far richer.

The Event itself has not changed.

What has changed is the Semantic World into which it has been admitted.

> *Meaning therefore does not arise from the isolated Event. It emerges from the continuously evolving Semantic World whose accumulated semantic organization provides the context required for that Event to be interpreted.*

The Emergence of Meaning

The preceding sections established the semantic principles governing the continuous evolution of a Semantic World. Persistent Identities preserve semantic reference. Immutable Events preserve semantic history. Identity-Centric Persistent Relations preserve the evolving semantic organization connecting those structures across time.

Individually, none of these semantic structures constitutes meaning. Nor does any isolated observation possess meaning independently. Every newly admitted Event derives its semantic significance from the persistent Semantic World into which it is incorporated.

As a Semantic World continuously accumulates lawful observations, semantic history expands, semantic organization becomes richer, and persistent semantic structures become increasingly interconnected. Meaning therefore emerges not from individual observations, but from the continuously evolving organization of the Semantic World as a whole.

> ***Meaning is the emergent semantic phenomenon arising from the accumulated semantic organization of a continuously evolving Semantic World.***

Individual observations contribute to this evolution, but they do not independently constitute meaning. Meaning continuously emerges as the Semantic World accumulates, preserves, and organizes semantic experience through time.

Necessary Conditions for Meaning

The Architecture of Intelligence identifies four necessary conditions for the continuous emergence of meaning.

Meaning requires:

- A persistent Semantic World.
- Persistent Identity continuity.
- Immutable Event history.
- Identity-Centric Persistent Relation continuity.

These conditions are jointly necessary because meaning does not arise from isolated observations. It emerges through the continuous accumulation and lawful organization of semantic experience within an evolving Semantic World. If any one of these conditions is absent, the Semantic World can no longer preserve the continuity required for meaning to emerge through time.

Relationship to Intrinsic Memory

Intrinsic Memory is the computational substrate that enables the continuous evolution of the Semantic World.

Its role is not to generate meaning, infer meaning, or reconstruct meaning on demand. Rather, Intrinsic Memory preserves the persistent semantic structures and semantic continuity through which the Semantic World continuously evolves. By preserving persistent Identities, immutable Events, and Identity-Centric Persistent Relations, Intrinsic Memory allows semantic history and semantic organization to accumulate rather than being repeatedly reconstructed or discarded.

Without Intrinsic Memory, observations may still be represented temporarily, but the Semantic World cannot evolve continuously. Semantic history fragments, semantic organization deteriorates, and newly admitted observations lose the persistent context from which meaning emerges.

> *Intrinsic Memory preserves not meaning itself, but the continuously evolving Semantic World from which meaning continuously emerges.*

Implications for Artificial Intelligence

The computational theory of meaning developed in this paper has significant implications for contemporary artificial intelligence.

Large Language Models, Knowledge Graphs, Vector Databases, traditional databases, and other computational systems are capable of representing, organizing, retrieving, and manipulating semantic information. However, these capabilities should not be confused with the computational conditions required for meaning to emerge.

Representations preserve information about semantic structures, but they do not themselves constitute a continuously evolving Semantic World. Consequently, such systems may perform sophisticated semantic computation while continually reconstructing semantic context rather than preserving its continuous evolution through time.

Within the Architecture of Intelligence, meaning depends not upon the existence of representations alone, but upon the continuous evolution of a persistent Semantic World whose semantic history and organization are preserved through Intrinsic Memory.

> *This distinction separates semantic representation from semantic existence.*

Conclusion

This paper has developed a computational theory of meaning founded upon the Architecture of Intelligence. It argues that meaning is neither an intrinsic property of language, symbols, computation, nor isolated observations. Instead, meaning emerges from the continuous evolution of a persistent Semantic World.
Persistent Identities preserve semantic reference. Immutable Events preserve semantic history. Identity-Centric Persistent Relations preserve the evolving semantic organization that connects those structures across time. Together, they enable the Semantic World to accumulate and organize semantic experience through continuous observation.
Individual observations therefore do not possess meaning independently. They derive meaning from their admission into an already evolving Semantic World whose accumulated semantic history and organization provide the context required for their interpretation.
Intrinsic Memory performs the fundamental computational responsibility of preserving this continuously evolving Semantic World. By maintaining semantic continuity through persistent semantic structures, it preserves the computational conditions under which meaning can emerge, evolve, and persist.

> ***Meaning is the emergent semantic phenomenon arising from the accumulated semantic organization of a continuously evolving Semantic World.***

References

1. Frege, G. (1892). On Sense and Reference. Zeitschrift für Philosophie und philosophische Kritik, 100, 25–50.

2. Tarski, A. (1944). The Semantic Conception of Truth and the Foundations of Semantics. Philosophy and Phenomenological Research, 4(3), 341–376.

3. Newell, A., & Simon, H. A. (1976). Computer Science as Empirical Inquiry: Symbols and Search. Communications of the ACM, 19(3), 113–126.

4. Searle, J. R. (1980). Minds, Brains, and Programs. Behavioral and Brain Sciences, 3(3), 417–457.

5. Marr, D. (1982). Vision. W. H. Freeman.

6. Harnad, S. (1990). The Symbol Grounding Problem. Physica D, 42(1–3), 335–346.

7. Gruber, T. R. (1993). A Translation Approach to Portable Ontology Specifications. Knowledge Acquisition, 5(2), 199–220.

8. Sowa, J. F. (2000). Knowledge Representation: Logical, Philosophical, and Computational Foundations. Brooks/Cole.

Citation

Ketabchi, R. Meaning and the Semantic World. Cosinia Research Paper No.6 Version 1.0

← Previous Next →