Strutome:
From Structural Interface to Structural Subject

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Abstract

This white paper introduces the Strutome as a structural subject for human–AI co-evolution. Emerging from the development of Adaptive Structure Programming (ASP), the Strutome reconceptualizes structure not as static constraint or mere interface, but as an adaptive structural field that configures the topology of admissible action.

Within this framework, AI operates through state-to-action mappings, while human decision processes are mediated by value and interpretation. The Strutome functions as the structural domain in which these asymmetries become mutually intelligible.

Semantics is redefined as structural coherence rather than symbolic correspondence, and grounding is achieved through stabilization across discrete structural updates. This event-based evolution, termed Strutomic Dynamics, describes the patterned transformation of the structural field over time.

Rather than offering a closed doctrine, the Strutome is presented as a design hypothesis: a proposal that meaningful human–AI coexistence depends not only on increasingly capable models, but on increasingly explicit structural design.

1 ASP and the Question of Interface

Adaptive Structure Programming (ASP) began as a refinement of constraint programming. Instead of treating constraints as fixed feasibility conditions, ASP reframed them as adaptive structural components shaping the meaningful action space of AI systems.

At first, ASP was described as an interface between human value systems and AI decision processes. In simplified form:

$$\text{Human Values} \rightarrow \text{Structure} \rightarrow \text{AI Action}$$

This model clarified that AI operates through state-to-action mappings,

$$a_t = \pi_\theta(s_t),$$

while humans operate through value-mediated judgment. ASP translated value into structure.

Yet the notion of "interface" soon proved insufficient.
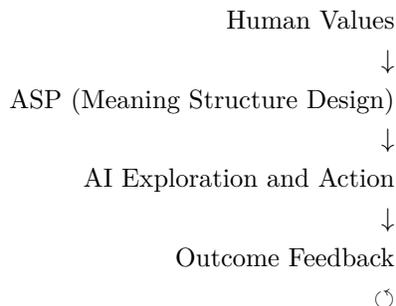
Structural Comparison

AI in Isolation

$$\text{State} \longrightarrow \text{Action}$$

Human Decision World

$$\text{Value} \longrightarrow \text{Interpretation} \longrightarrow \text{Judgment}$$

With ASP Introduced

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Human Values

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ASP (Meaning Structure Design)

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AI Exploration and Action

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Outcome Feedback

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ASP functions as a translation layer that converts human value structures into admissible structural configurations that AI systems can operate within.

An interface suggests a surface of contact, a boundary between two pre-defined domains. But ASP was not merely a contact layer; it shaped the topology within which both domains interacted.

The inadequacy of the interface metaphor becomes clearer once the structural asymmetry is recognized. Human value systems are not formatted inputs, and AI policies do not inherently produce meaning. What mediates them is not exchange but configuration.

If structure merely connected two domains, it would remain secondary to them. However, the preceding comparison shows that structure actively determines which transitions are admissible, which priorities are encoded, and which feedback loops are sustained.

Thus ASP cannot be reduced to a boundary mechanism. It begins to assume a more fundamental role: organizing the structural syntax within which interaction itself becomes possible.

This recognition motivates the conceptual move from interface toward a structurally autonomous field, later termed the Strutome.

2   From Interface to Strutome

The initial formulation of ASP described it as a structural interface between human values and AI systems. This description clarified an important asymmetry: AI operates through state-to-action mappings, whereas human decision processes are mediated by value and interpretation.

However, the notion of "interface" proved conceptually limited.

An interface suggests a surface of contact between two already-formed domains. It presumes that the human world and the AI system exist as separate entities that merely exchange information across a boundary.

The structural analysis developed earlier challenges this assumption.

Human values are not directly consumable by AI policies, and AI actions do not automatically acquire meaning in human contexts. What is required is not a contact surface, but a structured field within which admissibility, priority, and coherence can be configured.

This shift motivates the introduction of the *Strutome.*

The Strutome is not a boundary but a structural domain. It does not merely connect two systems; it organizes the topology within which their interaction becomes meaningful.

If $\mathcal{S}_t$ denotes the Strutome at time t, then AI action must satisfy structural admissibility:

$$a_t = \pi_\theta(s_t), \quad a_t \in \mathcal{S}_t.$$

Here, $\mathcal{S}_t$ is neither external supervision nor internal policy. It is the evolving structural field that configures possibility itself.

Once structure is recognized as such a field, further questions naturally arise: How does this field evolve? How does meaning emerge within it? And in what sense can such a structure exhibit agency?

The subsequent sections address these questions by introducing temporal deepening, Strutomic semantics, and the notion of the Strutome as a structural subject.

The need for a richer term led to the introduction of the *Strutome*[1].

The Strutome is not a boundary in the geometric sense, nor merely a mediation layer. It is a structural field that both separates and connects. It is selective, adaptive, and temporally extended.

If we denote the structural field at time t as $\mathcal{S}_t$, then AI action is not only generated by policy:

$$a_t = \pi_\theta(s_t),$$

but also structurally admissible:

$$a_t \in \mathcal{S}_t.$$

The Strutome defines the shape of possibility.

3 Temporal Deepening of Structure

The shift from interface to Strutome is inseparable from a shift in the understanding of time.

In classical engineering models, structure is often treated as static: a fixed feasibility region within which optimization occurs. Even when adaptation is allowed, time is frequently modeled as continuous parameter adjustment.

In the Strutomic framework, temporality carries a different meaning. Time is not merely a parameter of gradual change. It is the sequence of structural events through which admissible possibility is reconfigured.

Structure becomes historical.

Instead of static feasibility sets, structure evolves discretely:

$$\mathcal{S}_{t+1} = \Gamma(\mathcal{S}_t, \pi_\theta, V_h, \text{feedback}),$$

where V_h denotes human value input and feedback arises from AI–world interaction.

Each update marks a structural decision point. It may correspond to value clarification, anomaly detection, boundary correction, or priority reorganization.

Temporality here is event-based rather than fluid. The Strutome does not flow; it is revised.

This discrete evolution preserves interpretability. Because updates occur at identifiable moments, structural history can be inspected, justified, or overridden.

Thus temporal deepening signifies more than adaptation. It indicates that structure accumulates memory, records episodes of interaction, and stabilizes meaning over time.

A crucial shift occurred when structure was recognized as temporal.

Instead of static feasibility sets, structure evolves:

$$\mathcal{S}_{t+1} = \Gamma(\mathcal{S}_t, \pi_\theta, V_h, \text{feedback}),$$

where V_h denotes human value input.

This formulation expresses more than adaptation. It expresses structural memory. The Strutome carries historical imprints of interaction. It accumulates decisions, corrections, and refinements.

Structure is no longer a constraint; it is a trajectory.

4 Strutome as Structural Subject

With semantics redefined as emergent structural coherence, the Strutome must be clarified not merely as a mediator, but as the structural syntax of the transformation field.

The Strutome does not generate actions directly, nor does it interpret meaning in a representational sense. Instead, it organizes the topology of admissible transitions.

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[1]The term *Strutome* is a coined expression formed from "strut" and the suffix "-ome." The word "strut" evokes structural support or bracing, while "-ome" denotes a structured totality (as in genome or biome), without implying biological specificity. The term is pronounced *STRU-tome* (/ stru to m/), with primary stress on the first syllable. Its adjectival form, *Strutomic*, is pronounced *stru-TOM-ic* (/stru t m k/). The neologism is intended to designate an adaptive structural field that both supports and shapes the topology of admissible action between human and AI systems.

Formally, let $\mathcal{S}_t$ denote the Strutome at time t. It defines the structural syntax within which AI policy operates:

$$a_t = \pi_\theta(s_t), \quad \text{subject to } a_t \in \mathcal{S}_t.$$

Here, $\mathcal{S}_t$ functions analogously to a grammar of action, specifying which transitions are permissible, prioritized, or excluded.

Semantics, as discussed earlier, emerges not from symbolic reference but from the structured configuration of $\mathcal{S}_t$. Thus syntax and semantics are not hierarchically ordered but structurally intertwined: syntax shapes possibility; semantics arises from stabilized configuration.

The Strutome is therefore a structural subject in a precise sense. It possesses no intentionality, yet it exerts agency by determining the admissible topology of action.

Human values influence $\mathcal{S}_t$. AI behavior perturbs and reshapes $\mathcal{S}_t$ through feedback. Structure both constrains and enables both parties.

Subjectivity here is not psychological but configurational. The Strutome is the locus at which possibility is organized, reorganized, and stabilized across discrete structural events.

5 Co-Evolutionary Dynamics

With the Strutome established as a structural subject, co-evolution must be reformulated with greater precision.

The interaction is no longer dyadic (human–AI), but triadic:

$$\text{Human} \leftrightarrow \mathcal{S}_t \leftrightarrow \pi_\theta.$$

Human values influence the structural configuration $\mathcal{S}_t$. AI policies generate actions constrained by $\mathcal{S}_t$. World feedback perturbs both.

The Strutome evolves discretely:

$$\mathcal{S}_{t+1} = \Gamma(\mathcal{S}_t, \pi_\theta, V_h, \text{feedback}).$$

This evolution is not merely adaptive adjustment. It is structural reconfiguration through identifiable events. Each update reshapes the topology of admissible action.

We refer to this discrete structural evolution as *Strutomic Dynamics.*

Strutomic Dynamics denotes the patterned transformation of the structural field across event-based updates. It is neither continuous optimization nor spontaneous drift, but regulated reorganization of possibility.

In this dynamic, no single component dominates.

- Human value articulation modifies structural priorities.

- AI behavior reveals structural tensions or inadequacies.

- Structural updates redefine admissibility.

Co-evolution thus becomes structural rather than behavioral. Human and AI do not merely adapt to one another; they adapt through the Strutome.

The stability, coherence, and interpretability of this process depend on the properties of Strutomic Dynamics— a subject that invites further formal investigation.

The interaction becomes triadic:

$$\text{Human} \leftrightarrow \mathcal{S}_t \leftrightarrow \pi_\theta.$$

AI modifies structure through feedback; humans reshape structure through value articulation. The Strutome mediates and records these influences.

Thus emerges a structural feedback loop in which action space and model behavior co-evolve over time.

6 Semantics in the Strutomic Field

In classical theory, semantics is understood as a mapping from syntax to meaning. A formal language generates expressions (syntax), and interpretation assigns them truth or reference (semantics).

Within the Strutomic framework, this correspondence model becomes insufficient. AI systems operate syntactically through state-to-action mappings, while humans operate through value-mediated interpretation. Meaning cannot be reduced to symbol interpretation alone.

In the Strutome, semantics is not a static mapping. It emerges within an adaptive transformation field linking human values and AI actions.

Formally, if $\mathcal{S}_t$ denotes the Strutome at time t, semantics is not a function of syntax alone, but a property of structural admissibility:

$$\text{Semantics}_t \sim \text{Topology}(\mathcal{S}_t).$$

Meaning arises from the organization of permissible transitions, priority gradients, and structural boundaries within the action space.

Thus, semantics is neither internal representation nor external assignment. It is structural coherence generated through adaptive transformation.

The Strutome therefore redefines grounding: meaning is not attached to symbols, but stabilized through evolving structural configuration.

7 Philosophical Implications

The introduction of the Strutome and its Strutomic dynamics entails a shift in several foundational philosophical assumptions.

1. From Representation to Configuration

Classical philosophy of language and mind often treats meaning as representational. Symbols correspond to objects; syntax is mapped to semantics through interpretation. In the Strutomic framework, meaning is not primarily representational. It is configurational.

Meaning does not arise from symbolic reference alone, but from the structured organization of admissible action. The topology of $\mathcal{S}_t$ determines which transitions are coherent, which priorities dominate, and which behaviors are structurally excluded. Semantics becomes a property of configuration rather than correspondence.

2. Grounding as Structural Stabilization

The grounding problem has traditionally asked how symbols connect to the world. The Strutome reframes this question.

Grounding is not solved internally within AI models, nor externally through human interpretation alone. Instead, grounding is achieved through structural stabilization across iterative updates of $\mathcal{S}_t$.

Meaning is not attached to tokens; it is stabilized through the evolution of the transformation field.

3. Distributed Structural Agency

The Strutome complicates classical notions of subjectivity. Agency is no longer exclusively human, nor reducible to AI optimization.

Human values influence structure. AI behavior modifies structure through feedback. Structure in turn constrains and enables both.

Subjectivity becomes distributed across a triadic relation:

$$\text{Human} \leftrightarrow \mathcal{S}_t \leftrightarrow \pi_\theta.$$

The Strutome is not conscious, yet it shapes possibility. Its subjectivity lies in its capacity to configure the space of admissible action.

4. Event-Based Temporality

Because Strutomic dynamics remains discrete, structural change occurs through events rather than continuous flow.

Each update of $\mathcal{S}_t$ marks a decision, correction, or reconfiguration. Temporality becomes historical rather than merely chronological.

Meaning therefore evolves through structural episodes.

5. Coherence over Truth

The Strutomic model shifts emphasis from truth conditions to structural coherence. The central question is not whether a representation corresponds to reality, but whether the evolving structural field maintains stable, interpretable, and normatively aligned configurations.

Truth may still matter, but coherence becomes primary.

8 Engineering Design Challenges

While the Strutome has been articulated as a structural subject, its engineering realization presents substantial challenges. Explicitly acknowledging these challenges strengthens, rather than weakens, the proposal.

1. Stability of Structural Evolution

If structure evolves according to

$$\mathcal{S}_{t+1} = \Gamma(\mathcal{S}_t, \pi_\theta, V_h, \text{feedback}),$$

what guarantees boundedness? Without stability conditions, structural adaptation may oscillate, fragment, or drift toward incoherence. Minimal convergence criteria or structural regularization principles must be defined.

2. Governance and Override Mechanisms

If the Strutome functions as a structural subject, where does ultimate authority reside? Engineering design must specify explicit override conditions, fail-safe regions, and escalation protocols. Human sovereignty cannot remain implicit.

3. Structural Transparency

Unlike opaque AI models, the Strutome must remain inspectable. Its topology, priority gradients, and admissibility conditions should be interpretable. Otherwise, structural agency risks becoming another black box.

4. Multi-Agent Structural Negotiation

In realistic systems, multiple AI agents and multiple human stakeholders interact simultaneously. The Strutome must therefore support structural negotiation and reconciliation of competing feasible regions.

5. Co-Evolution Mechanisms

Although human-initialized, the long-term vision of the Strutome includes co-evolution with AI systems. However, the formal mechanisms for safe structural proposal, evaluation, and incorporation remain underdeveloped. This constitutes an open research frontier.

Conclusion

The progression from constraint-based reasoning to Adaptive Structure Programming (ASP), and from interface to Strutome, reflects a deep transformation in how structure is understood within human–AI systems.

Structure is no longer static feasibility, nor merely a mediation layer. It becomes a temporally extended field that configures admissible action, stabilizes meaning, and evolves through discrete structural events.

The Strutome has been articulated not as metaphor, but as a structural subject: a domain that organizes possibility without collapsing into either human intentionality or machine optimization.

Within this domain, semantics is redefined as structural coherence, grounding becomes stabilization across updates, and co-evolution proceeds through Strutomic Dynamics— the patterned, event-based transformation of the structural field.

Yet the Strutome remains a hypothesis. Its stability conditions, governance mechanisms, and multi-agent negotiation principles require disciplined engineering inquiry.

What emerges is not a closed doctrine, but a design orientation.

If AI systems are to coexist meaningfully with human value worlds, structure itself must become an explicit object of design. The Strutome proposes that such structure is not peripheral, but central: not a boundary, but a domain; not a constraint, but a configuration of possibility.

In this sense, the future of human–AI coexistence may depend less on increasingly powerful models and more on increasingly explicit structural design.

The path from constraint programming to ASP, and from interface to Strutome, represents not merely conceptual refinement but temporal deepening. Structure has shifted from static feasibility to adaptive mediation and finally to structural subjectivity.

Yet the Strutome is not a completed doctrine. Its realization demands rigorous attention to stability, governance, transparency, multi-agent coordination, and co-evolution.

Rather than offering closure, this white paper marks an opening: a proposal that structure itself may become the central design principle for meaningful human–AI coexistence.

The Strutome is neither a metaphor nor a finished system. It is a structural hypothesis—one that invites engineering discipline and philosophical scrutiny in equal measure.