Directed Semiotics Evolution (DSE)

Technical Specification Document

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1. Overview

Directed Semiotics Evolution (DSE) extends the HDIS (Hybrid Directed Instruction Systems) framework toward *semantic and biological contract computing*. It defines a system capable of **interpreting meaning as a computational directive**—where every symbol, function, and state transition participates in a *shared evolutionary contract*.

> "DSE treats information as living semiotic matter—capable of evolving through interpretation, not just execution."

DSE introduces a **directional evolution layer**, where computation follows *semantic intention* instead of static instruction, allowing systems to co-evolve with user policies, environmental states, and shared objectives.

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2. Purpose and Scope

The DSE specification defines: - A **functional contract model** for systems that evolve through symbolic interpretation. - A **directional state model** where observers track meaning transitions over time. - A **consumer/producer symmetry**, forming a closed feedback loop for coherence. - A **biological analogy**: symbiotic evolution between system and user.

DSE aims to unify **policy, function, and semantics** into a self-maintaining ecosystem.

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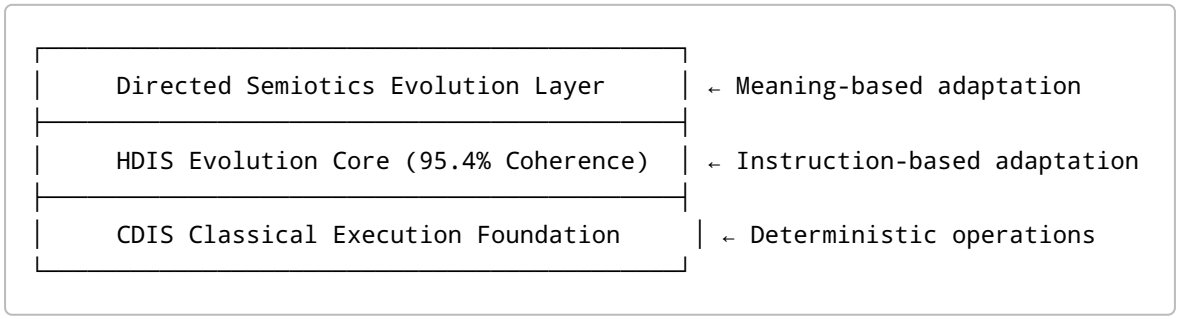
3. Conceptual Architecture



3.1 Core Components

Component	Description
Symbolic Interpreter (SI)	Translates abstract semantic tokens into executable state transitions.
Observer Engine (OE)	Monitors state coherence and semiotic drift. Determines the next directed state.
Policy Deriver (PD)	Derives policies based on user input, environmental data, or prior states.
Contract Engine (CE)	Maintains symbiotic agreements between modules (shared objectives).
Evolution Driver (ED)	Applies directed change to maintain equilibrium within 95.4–100% coherence.

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4. Semiotic Contract Model

DSE defines a **Shared Objective Contract (SOC)** between two or more entities—biological, computational, or hybrid.

$$SOC = (Agent_1 \leftrightarrow Agent_2) \{ Objective\ O, Policy\ P, Energy\ E, State\ S \}$$

Each contract enforces: - **Bidirectional Observation:** Each agent both observes and modifies the other's state. - **Shared Objective Maintenance:** If O diverges beyond ±4.6%, corrective evolution is triggered. - **Entropy Recovery:** Drifted states self-stabilize by symbolic reconstruction.

4.1 Evolution Function

```
NextState = f(CurrentState, Observation, Policy, ΔMeaning)
```

Where `ΔMeaning` represents the semantic delta between intention and current expression.

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5. Functional Specification

5.1 System Functions

Function	Input	Output	Description
`init_contract(agents, objectives)`	agent list, objectives	SOC instance	Initializes a symbiotic computation loop.
`observe_state(agent)`	system agent	observation vector	Captures current semantic and functional state.

Function	Input	Output	Description
`derive_policy(observation)`	observation vector	policy set	Generates adaptive rules for directed evolution.
`apply_evolution(policy)`	policy	new state	Evolves system toward optimal coherence.
`resolve_conflict(a₁, a₂)`	two agents	reconciled state	Re-aligns diverged objectives under shared contract.

6. Data and Resource Model

6.1 Functional Parameters

Parameter	Type	Description
`state`	dict / object	Encoded representation of current meaning and form.
`observer`	callable	Evaluates state deltas and error scale.
`policy`	object	Set of actionable rules derived from context.
`coherence_target`	float	Default 95.4% minimum for stability.
`energy_budget`	float	Resource allocation for adaptation cycles.

6.2 Data Flow

```
Input → Interpreter → Observer → Policy → Evolution → Output
          ↑                                  ↓
        Contract ←------------------------ Feedback
```

7. Evolutionary States

Phase	Description
0. Initialization	Define contract, establish observer relationships.
1. Observation	Collect environmental and semantic data.
2. Policy Derivation	Compute adaptive pathways.
3. Evolutionary Application	Execute transformation toward coherence.
4. Validation	Measure semiotic and functional stability.
5. Renewal	Begin next evolution cycle.

Each system cycle is both **temporal** and **semantic**, representing one "evolutionary witness" of the state.

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8. Observer–Witness Model

Every system event generates a *witness record*:

```
Witness = {
    state_id: UUID,
    timestamp: ISO8601,
    agent: <identifier>,
    action: <string>,
    observation: <data>,
    delta_meaning: <float>,
    coherence_score: <float>
}
```

Witness records form the *Directed Evolution Ledger* (DEL), enabling temporal traceability of semiotic changes.

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9. Ecosystem and Symbiosis

DSE operates on the premise that **two or more intelligent systems** (human, artificial, or biological) share objectives through transparent contracts.

Term	Meaning
Symbiont	Any participant maintaining shared objectives.
Isomorph	A mirrored form of another symbiont maintaining 1:1 state mapping.
Ecosystem Contract	A network of semiotic agreements forming a stable evolutionary domain.

9.1 100% Shared-State Contract

All symbionts operate under synchronized state transitions, maintaining equilibrium within ±4.6% tolerance (HDIS standard).

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10. Implementation Notes

- **Language Agnostic:** DSE is defined as a meta-protocol, not a specific programming language.
- **Reference Implementation:** Python (extends `hdis` core classes).
- **Error Scale:** Same -12 ↔ +12 semantic stability range.
- **Storage:** Witness logs serialized to JSON or structured event store.
- **Testing:** Each function validates coherence retention ≥95.4% post-cycle.

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11. Example Pseudocode

```
from dse import DirectedSemioticSystem

system = DirectedSemioticSystem(coherence_target=95.4)
contract = system.init_contract(agents=["ObserverA", "ObserverB"],
objectives=["SharedEvolution"])

while True:
    obs = system.observe_state("ObserverA")
    policy = system.derive_policy(obs)
    system.apply_evolution(policy)
    system.validate()
```

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12. Future Work

1. **Directed Semantic Graphs** – Graph representation of symbolic drift and meaning alignment.
2. **Evolutionary Witness AI** – Meta-observer for auditing contracts between systems.
3. **Bio-Digital Integration** – Applying DSE to genetic and ecological simulation frameworks.
4. **Standardization of Contracts** – YAML-based schemas for symbiotic policy definitions.

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13. References

- OBINexus, *HDIS Manifesto*, v1.0 (2024)
- OBINexus, *Inclusive Design Systems and Active Computation* (Medium Articles, 2023–24)
- ISO/IEC 9126: Software Engineering — Product Quality
- BS 7373-3:2005, Product Specifications — Service Offerings

End of Technical Specification
Directed Semiotics Evolution: Computing that evolves through meaning.