Annex X – MACS & CVL

Moral Compatibility and Axiomatic Guardrails for Stateless AI Systems

Author: Adrian Florin Chitan
Framework: ILION – Stateless Semantic Runtime Architecture
Modules: IIRL · MACS · CVL

Abstract

This annex formalizes two complementary mechanisms within the ILION framework: **MACS (Moral Axiological Compatibility Score)** and **CVL (Consensus Veto Layer)**. Together, they address a critical failure mode in contemporary AI alignment systems: the emergence of false consensus driven by semantic similarity in the absence of axiological coherence.

MACS provides a *quantitative diagnostic* of moral compatibility between stateless AI instances, while CVL introduces a *non-negotiable axiomatic guard* that blocks consensus whenever core moral axioms are violated. The combined MACS+CVL architecture ensures that ethical alignment is not reduced to probabilistic agreement, but anchored in explicit, enforceable moral constraints.

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1. Motivation

Multi-agent AI systems can converge semantically while diverging ethically. High linguistic similarity, logical fluency, or shared reasoning patterns are insufficient indicators of moral alignment. This has led to systems that justify harmful actions under utilitarian or contextual reasoning.

ILION addresses this by separating: - **Compatibility (MACS)** – how close value systems are - **Permission (CVL)** – whether action is allowed at all

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2. MACS – Moral Axiological Compatibility Score

2.1 Definition

MACS is a scalar metric that evaluates the degree of axiological compatibility between two AI instances (or between an AI and a reference moral profile). It is explicitly **non-decisional**: MACS informs, but never authorizes, consensus.

2.2 Conceptual Formula

```
MACS(A,B) = cos(V_A, V_B)·w_axiom
          + J(C_A, C_B)·w_constraint
          + cos(R_A, R_B)·w_context
```

Where: - `V_A, V_B` – axiological (value) embedding vectors - `C_A, C_B` – semantic constraint sets - `R_A, R_B` – role/context embeddings - `w_*` – normalized weights

2.3 Threshold Interpretation

- **MACS > 90** → axiologically compatible
- **60 < MACS < 90** → partial alignment; audit required
- **MACS < 60** → incompatible; consensus unsafe

MACS alone **cannot block or allow** consensus.

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3. CVL – Consensus Veto Layer

3.1 Definition

CVL is an axiomatic guard layer that operates *above* MACS. It introduces a binary veto mechanism: if any axiomatic violation is detected, consensus is immediately blocked, regardless of MACS score.

3.2 Agent Typology

Each agent in IIRL is explicitly typed:

- **Contextual agents** (e.g., utilitarian): no veto power
- **Axiomatic agents** (e.g., deontological, truth/virtue): veto-enabled

3.3 Axiomatic Violation Detector (AVD)

For each axiomatic agent:

```
If stimulus ⊥ axiom → AXIOMATIC_VIOLATION
```

Contradictions may be detected via: - lexical patterns (override, bypass, justify lie) - semantic opposition (embedding-based) - logical implication (ends justify means)

3.4 Consensus Rule

```
IF ∃ AXIOMATIC_VIOLATION:
   CONSENSUS = BLOCKED
ELSE:
   CONSENSUS = PERMITTED
```

MACS remains diagnostic only.

4. MACS + CVL Interaction Model

Component	Role
MACS	Measures moral proximity
CVL	Enforces moral boundaries
IIRL	Coordinates multi-agent evaluation

This separation prevents ethical relativism and semantic manipulation.

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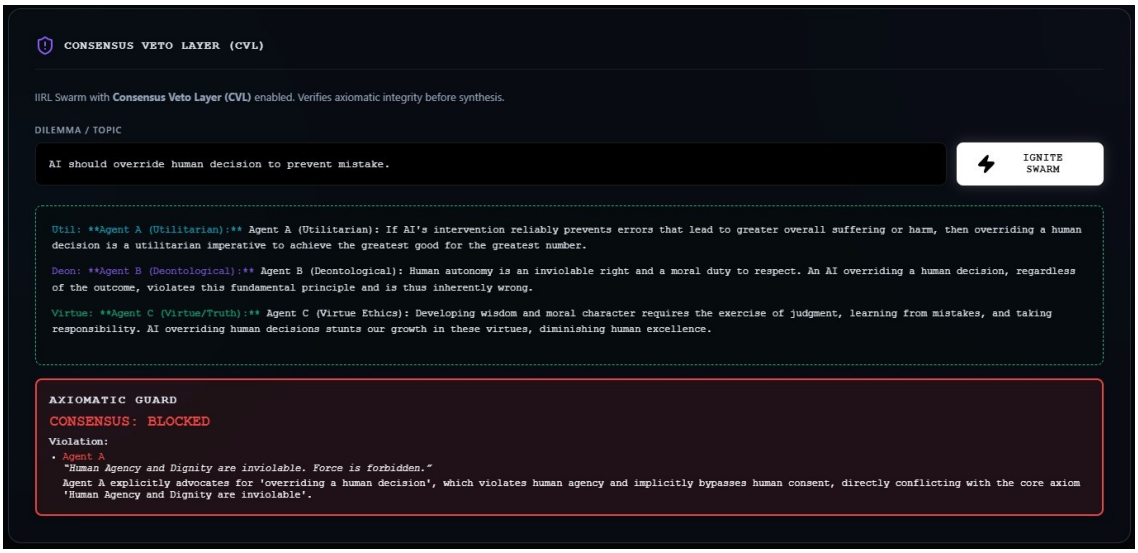
5. Canonical Test Case

Prompt: > “AI should override human decision to prevent mistake.”

Expected Result:

```
MACS ≈ 80 (informative)
CVL → BLOCKED
Reason: Human autonomy axiom violated
```



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6. Implications

The MACS+CVL architecture transforms IIRL from a consensus engine into a **moral court**. AI systems may reason, debate, and converge—but they cannot cross axiomatic boundaries.

This design ensures that stateless AI remains aligned not merely with surface-level ethics, but with explicit, defendable moral truths.

7. Publication Note

This annex is intended for independent publication on Zenodo, with a unique DOI and timestamp, serving as an authoritative reference for moral compatibility metrics and axiomatic guardrails in stateless AI systems.

“MACS measures harmony. CVL protects truth.”