

Decision Trace Generation for Governable Clinical Decision Support

Version 1.0

June 2026

A proposal for independent scientific validation of runtime-generated decision traces for trustworthy clinical decision support systems.

We are not asking whether AI can make better medical recommendations.

We are asking whether AI-assisted clinical decisions can become scientifically traceable.

Background

Artificial intelligence is increasingly being incorporated into clinical decision support, medical imaging, diagnostic assistance, treatment recommendation, and patient risk assessment. These systems are beginning to support decisions in environments where reproducibility, accountability, and clinical governance are increasingly important.

As these systems participate in decisions that may directly affect patient outcomes, one fundamental question becomes increasingly important:

Can AI-assisted clinical decision processes become structurally observable and scientifically verifiable without modifying the underlying AI model?

Current approaches often evaluate clinical AI through predictive performance, explainability techniques, or retrospective validation.

SSGE (Structural System Governance Engine) explores a different architectural direction.

Rather than changing the clinical AI model itself, SSGE introduces an independent Governance Runtime that observes execution and generates a structured Decision Trace describing execution flow, evidence references, rule evaluation, and governance events throughout the decision process.

The objective is not to improve diagnostic capability, but to improve the observability, traceability, and governability of AI-assisted clinical execution.

Proposed Scientific Validation

We would like to invite your research team to participate in a small feasibility study.

Research Question

Can an independent Governance Runtime generate a structured Decision Trace that meaningfully represents AI-assisted clinical decision processes without modifying the underlying AI model?

The validation focuses exclusively on this question.

No performance benchmark, commercial deployment, or product evaluation is involved.

Example Validation Scenario

Scenario

An AI-assisted clinical decision support system provides diagnostic recommendations based on patient information and medical guidelines.

Governance Runtime

The proposed study investigates whether an independent Governance Runtime can continuously generate structured Decision Trace artifacts throughout the clinical decision process without influencing the underlying AI model.

Validation Focus

The objective is not to evaluate diagnostic performance, but to investigate whether runtime-generated execution evidence can improve the observability, scientific traceability, and governance readiness of clinical AI systems.

Scope (2-week Feasibility Study)

The proposed study would evaluate whether SSGE can:

- generate structured Decision Trace artifacts during AI-assisted clinical decision execution;
- preserve execution order and clinical decision relationships;
- produce trace information that is independently reviewable by researchers;
- provide a reproducible basis for governance-oriented analysis of clinical AI.

Expected Outcome

The expected outcome is not proof that SSGE is superior to existing systems.

Instead, we seek to answer a more fundamental scientific question:

Does Decision Trace Generation represent a viable architectural direction for governable clinical decision support?

If the answer is positive, the results could support further collaborative research, broader validation studies, and future publications. More importantly, the study aims to contribute empirical observations to the broader discussion on trustworthy AI infrastructure and runtime governance.

Collaboration Principles

This proposal is:

non-commercial

non-exclusive

intended purely for scientific exploration.

We welcome critical evaluation and independent feedback.

Why This Validation Matters

If successful, this study would provide initial empirical evidence that runtime-generated execution evidence can improve the scientific traceability of AI-assisted clinical decision processes without affecting existing clinical AI systems.

More broadly, the study investigates whether governance runtime architectures can strengthen transparency, accountability, and trustworthiness in future clinical decision support systems while remaining independent of diagnostic model design.

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