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Quantum-Inspired Rogue Variable Modelling[1]

A breakthrough approach to understanding human cognitive states in transition — teaching AI systems to recognize, interpret, and safely navigate the uncertain moments when human thoughts, emotions, and decisions are still forming.

1 Based on the pending utility process patent application number TPP96216, owned by Alexander Mathiesen-Ohman

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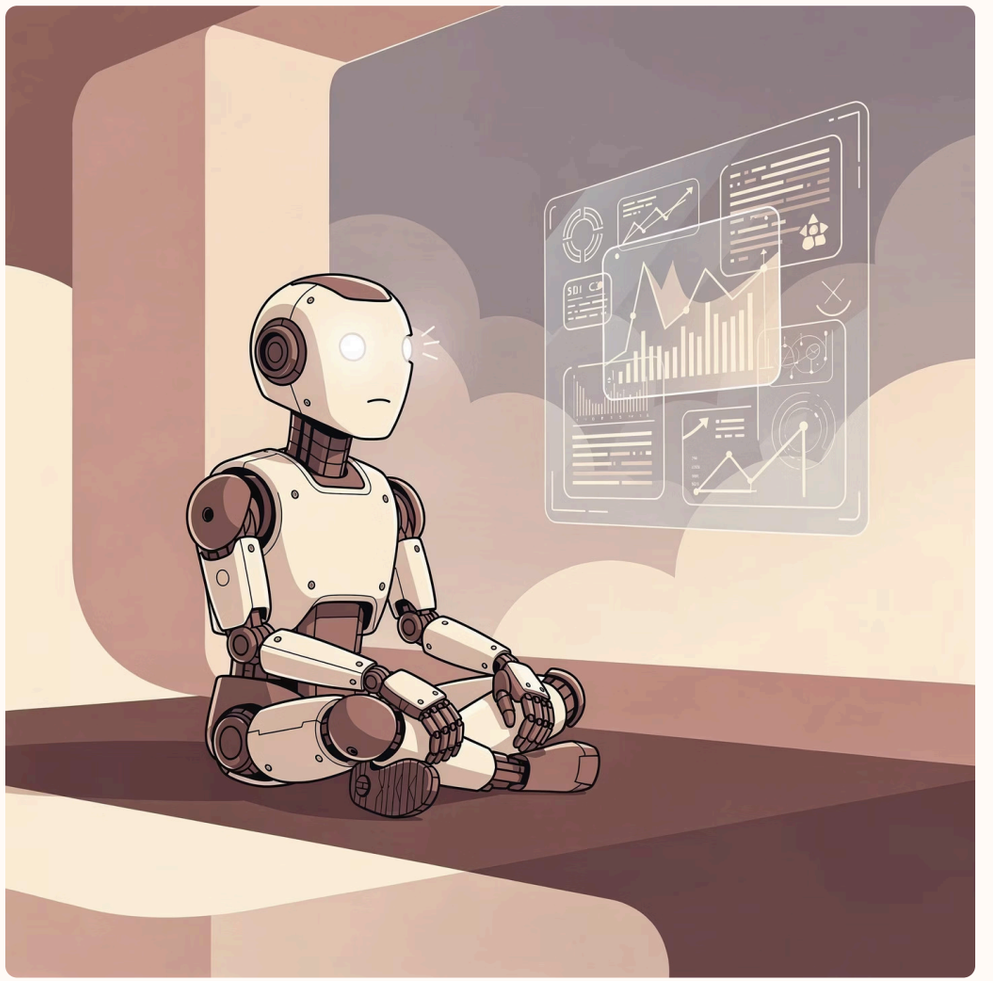
The Challenge

When Human Signals Don't Add Up

Existing AI systems struggle when human signals conflict or become unclear. Traditional models treat these conflicts as errors or noise, but they're actually meaningful transitional states that reveal important cognitive processes.

Common scenarios where AI interpretation fails:

- Heart rate rises while behavior remains calm
- User suddenly changes direction on a predicted decision
- Emotional signals conflict with contextual information
- Mixed or competing mental states during transitions



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Five Core Components Working in Harmony

Quantum-Inspired Cognitive Encoding (QRVM)

Represents unclear mental states as clouds of possibilities without forcing premature assumptions

Rogue Variable Detection

Recognizes when the AI is confused or at risk of misinterpreting human states

Human-in-the-Loop Decoherence (HILD)

Triggers clarification exchanges when the system needs help resolving ambiguity

Rogue Variable Library (RVL)

Stores memory of past ambiguous situations and their resolutions for learning

Rosetta Stone Layer (RSL)

Identifies universal cognitive patterns across users while preserving privacy

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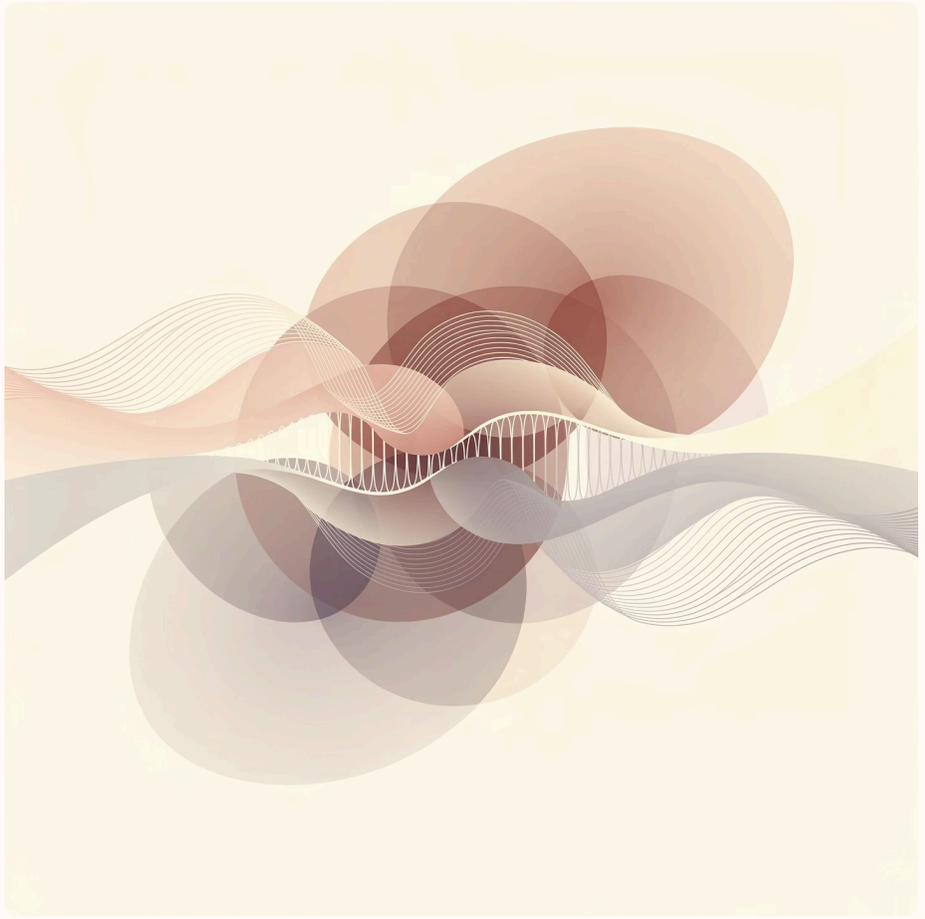
Representing Thinking as Clouds of Possibilities



Beyond Binary Interpretation

Instead of forcing a single fixed interpretation, the system represents thinking quantum-style — as multiple coexisting possibilities that update continuously.

This approach naturally handles:

- Mixed emotions and competing interpretations
- Unstable decision states
- Contradictory physiological and behavioral signals
- Transitional cognitive phases

Data sources include wearables, behavioral patterns, conversation analysis, and environmental context — all integrated into a dynamic cognitive model.

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Detecting Rogue Variables

When the AI Recognizes Its Own Confusion

1

Pattern Mismatch

System identifies repeated conflicts between expected and actual cognitive patterns in the user's data streams

2

Source Identification

Pinpoints which components of the cognitive model are generating confusion or uncertainty

3

Coherence Testing

Tests whether removing or down-weighting confused components improves interpretation clarity

4

Classification

If coherence improves, the situation is classified as a rogue variable state requiring intervention

A rogue variable isn't bad data — it's a pattern of AI confusion signaling that the user is transitioning toward something important.

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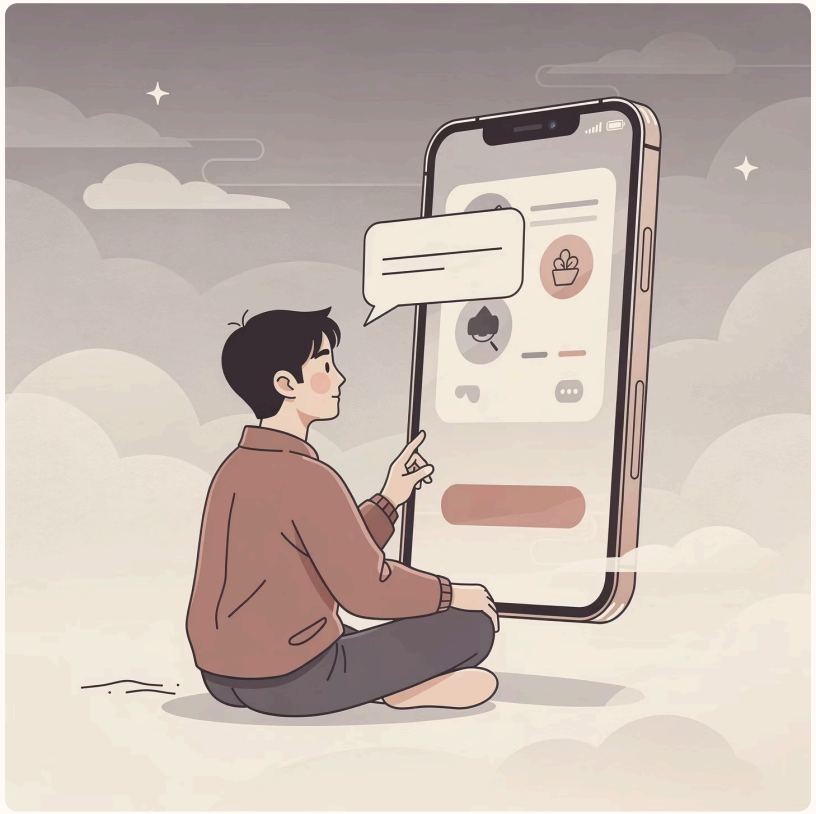
Human-in-the-Loop Decoherence

Safety Through Minimal Clarification



When the system cannot safely interpret a cognitive state, it stops all prediction and autonomous action. Then it asks one minimal clarification question.

Example prompts:

- "Are you preparing for an action or reflecting on something?"
- "Which situation best matches what you're experiencing?"

This user response "collapses" the ambiguous state into clarity. If no response comes, the system retries once, then enters Passive Safe Mode — guaranteeing safety and accuracy over speed.

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Learning from Every Ambiguous Moment

1 Event Detection

Rogue variable state identified during user interaction

2 Clarification

HILD engages user for minimal input to resolve ambiguity

3 Storage in RVL

Cause, clarification method, and outcome saved to personal library

4 Pattern Recognition

System learns individual behavioral signatures during transitions

5 Improved Detection

Future ambiguity detected earlier with fewer clarification needs

The Rogue Variable Library becomes increasingly personalized over time, learning how each individual thinks during stress, decision-making, emotional changes, and cognitive transitions. The result: a system that adapts to your unique mental patterns.

Collective Intelligence Without Compromising Privacy

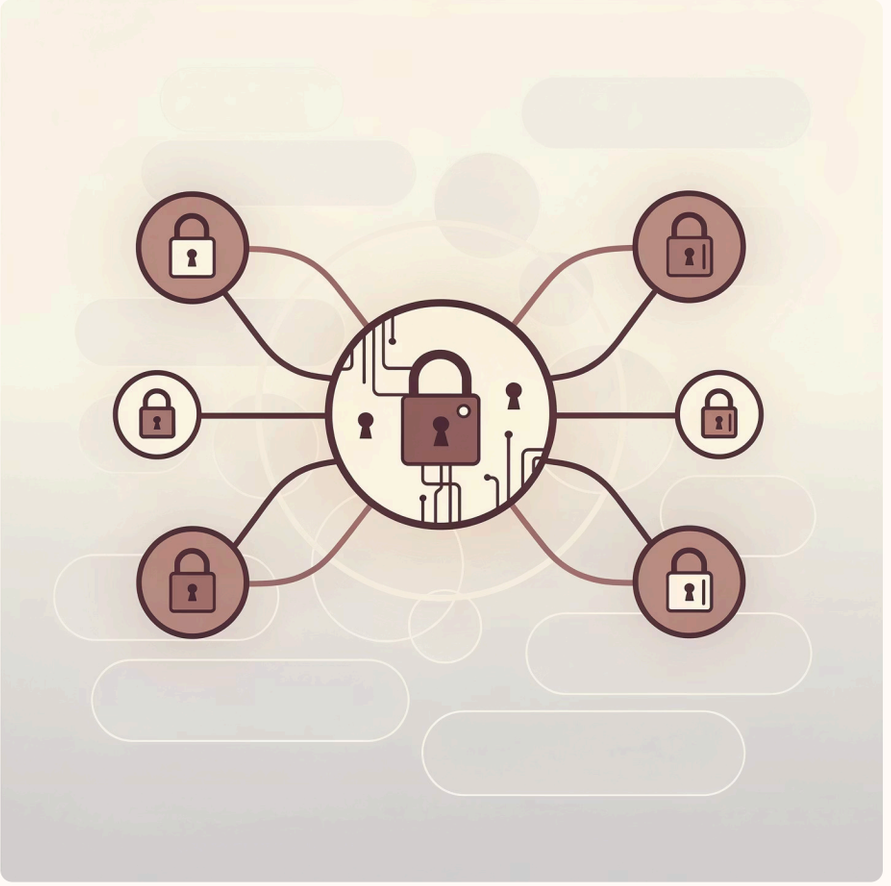
The Rosetta Stone Layer

While the RVL is deeply personal, the RSL discovers shared patterns across all users using differential privacy and federated learning — never exposing individual data.

What it reveals:

- Shared precursors to stress or decision-making
- Common cognitive instability patterns
- Group-level emotional trends
- Early indicators of collective events like organizational stress

This enables population-level cognitive inference while maintaining complete individual privacy — a breakthrough in collective intelligence systems.



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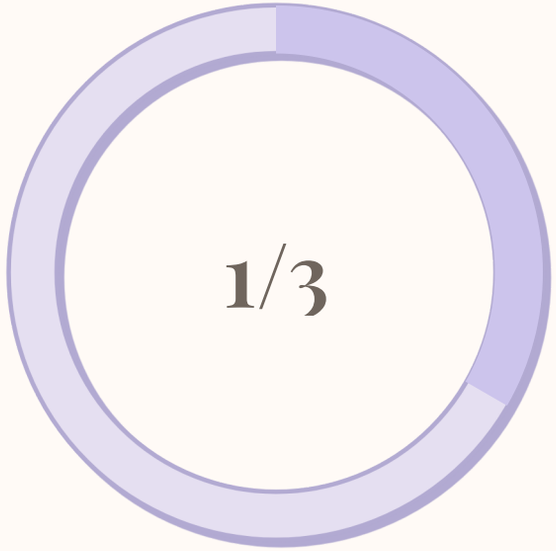
A New Paradigm for Human-AI Symbiosis

Safety First

AI never acts on misunderstood states



Reduced Errors

Fewer misinterpretations through targeted clarification

Continuous Learning

System adapts to individual and collective patterns

Core Innovation: The AI can represent uncertainty as a valid cognitive state, knows when it doesn't know, asks safely and minimally, and builds collective intelligence without sacrificing privacy — enabling true adaptive human-AI symbiosis.