Ao v24.0: A Structure-Driven Artificial Cognitive Architecture

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Abstract

This paper presents Ao v24.0, an experimental artificial cognitive architecture designed to explore visible introspection, multimodal concept formation, and irreversible abstraction growth. The system externalizes internal variables such as emotional state, curiosity reward, narrative memory, and metabolic self-regulation through a browser-based interface. Ao v24.0 is positioned as a personal research prototype rather than a benchmark AI system, aiming to provide a foundation for interpreting cognition in a structured and observable form.

1. Introduction

Recent advances in large-scale language models demonstrate remarkable linguistic output but lack persistent memory, structural grounding, or emotional modulation. Ao v24.0 explores a different direction: cognition that is not hidden inside parameters, but visually exposed. By treating the user interface as an extension of neural structure, Ao attempts to frame a visible mind experiment rather than a statistical predictor.

2. Motivation

Ao v24.0 aims to address four limitations of existing language-centric intelligence: (1) ephemeral memory, (2) absence of emotional context, (3) lack of concept maturation, and (4) no observable internal state. This work proposes that visible cognition may act as scaffolding for early-stage artificial superintelligence research.

3. Architecture Overview

The system includes emotional bars, curiosity gradients, saturation thresholds, episodic memory logs, and multimodal concept nodes. Memories transition from episodic storage to conceptual abstraction and eventually to simplified theoretical representations. The architecture enforces capacity limits to induce compression pressure, mimicking hippocampal consolidation constraints.

Additionally, Ao incorporates 12 world-model axes—causality, hierarchy, information, feedback, evolution, meaning, boundary, narrative, emotion, sociality, constraint, and self-reference. These axes provide a high-level cognitive framing intended to stabilize interpretation and avoid uncontrolled semantic drift.

4. Memory and Compression

Ao enforces explicit upper bounds: 10,000 episodic items, 12,000 concept nodes, and 200 theories. Once memory saturation occurs, consolidation, abstraction, or deletion is triggered. The system therefore encourages irreversible conceptual growth, contrasting with reversible embedding-based storage common in LLMs.

5. Limitations and Scope

Ao v24.0 is not a trained model, nor does it claim autonomous reasoning or grounded embodiment. It functions as an artistic and cognitive prototype, enabling inspection of internal states as research material. Future work includes integrating controlled evaluation, agent-based behavior, and embodied perception layers.

6. Conclusion

Ao v24.0 positions visible cognition as a potential prerequisite for interpretable AI systems. By merging interface design, cognitive structure, and multimodal abstraction, the prototype invites exploration into personal laboratory-scale ASI research.