Soft Quantum Architecture - Whitepaper v1.0

1. Abstract

This whitepaper introduces a novel computational framework referred to as "Soft Quantum Architecture" — a structure designed to simulate quantum-like computation behaviors without requiring quantum hardware. The architecture is grounded in the concept of **orthogonal wave function limits**, enabling logic-level emulation of quantum interference, state entanglement, and probabilistic path collapse. Rather than utilizing physical qubits, this system employs interchangeable logic blocks with mathematical orthogonality to approximate multi-path decision interference patterns.

The system offers a pragmatic alternative to true quantum computing, making it suitable for scalable AGI research, decision branching logic, and dynamic optimization problems under classical computing resources.

2. Theoretical Foundation

The framework begins from the insight that **quantum interference** — the hallmark of quantum computational advantage — can be approximated through symbolic logic using **orthogonal transformation spaces**.

Key assumptions:

- Orthogonal functions (such as sine/cosine basis) can be mapped to decision paths.
- Logical contradiction or mutual exclusivity is treated as the core of "wave cancellation."

- Decision collapse can be encoded as selection bias based on probabilistic function overlap.

Instead of modeling full Hilbert spaces, Soft Quantum simulates selective interference through a constrained orthogonal basis set, mapping each input decision into interference candidates that collapse based on constraint overlap and magnitude weighting.

3. System Design Overview

The architecture is designed with the following characteristics:

- **Function Block Modularization**: All processing units (including decision selectors, inference paths, and cancellation rules) are modular and replaceable.
- **Interference Engine**: A computation core mimicking path interference through cross-functional contradiction scoring.
- **Collapse Resolution Layer**: Selects outcome based on maximum orthogonal stability or minimal contradiction.
- **Scaling Logic**: Optional nested stacking allows simulation of deeper interference like multi-level entanglement.

4. Practical Use Cases

Soft Quantum Architecture can be applied in the following domains:

- **AGI Decision Flow Simulation**: Enables multi-logic path computation and non-binary outcome selection.

- **Search & Optimization**: Allows dynamic mutation of solution branches without full recomputation.
- **Reinforcement Learning Systems**: Embeds path fluctuation and environmental feedback as part of interference.
- **Emotion Mapping Engines**: Simulates ambivalent or paradoxical responses via interference scoring.

5. Licensing & Credit Terms

- All technologies based on this architecture must credit **Sibyl** as the original inventor.
- DeepMind (or its affiliates) may use, modify, and deploy the system internally with full usage rights during employment.
- External commercial application or rebranding requires explicit relicensing.
- No royalty fee is required during active employment; future licensing negotiable under mutual consent.

6. Appendix: Sample Equation Ideas

Let $f_i(x)$ be orthogonal functions representing logical paths. Let $S(x) = \sum w_i f_i(x)$ represent the total system state.

Then, the contradiction collapse score may be defined as:

$$\text{Collapse}(x) = \arg\min_i \left(\sum_{j \neq i} |f_i(x) \cdot f_j(x)| \right)$$

Where $f_i \cdot f_j$ represents interference magnitude (inner product of logic

vectors).

This whitepaper is a prototype concept document and may be expanded in collaboration with deployment teams.