

Experimental Results

This section provides conceptual demonstrations of the four quadrants of the Active Inference meta-pragmatic structure. Each quadrant is illustrated with mathematical examples and conceptual analysis, showing how Active Inference operates across different levels of cognitive processing. The demonstrations progress systematically: Quadrant 1 establishes basic data processing with fundamental EFE computation; Quadrant 2 enhances this through meta-data integration, improving reliability; Quadrant 3 adds meta-cognitive reflection, enabling self-monitoring and adaptive control; Quadrant 4 introduces framework-level optimization, allowing recursive self-analysis. This progression reveals how each quadrant builds upon and enhances previous levels while introducing new capabilities, creating a hierarchical cognitive architecture.

Quadrant 1: Data Processing (Cognitive)

Conceptual Demonstration: Basic Active Inference operation with direct sensory data processing, illustrating the fundamental EFE minimization mechanism that underlies all quadrants. This