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Complete reference for all **System Workflows** (49) and **System Methods** (70+) with UI names, scientific names, descriptions, parameters, and inputs/outputs.

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System Methods

All system methods are protected—admins can only modify parameters and enabled status, not method definitions.

Generation Methods

GENERATE_RESPONSE

Attribute	Value
UI Name	Generate
Scientific Name	Basic Generation
Code	`GENERATE_RESPONSE`
Description	Generate a response to a prompt using specified model
Complexity	Simple

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `temperature` | number | 0.7 | Sampling temperature (0-2) | | `max_tokens` | integer | 4096 | Maximum output tokens |

Inputs: `prompt`, `context` **Outputs:** `response`

GENERATE_WITH_COT

Attribute	Value
UI Name	Think Step-by-Step
Scientific Name	Chain-of-Thought Generation
Code	`GENERATE_WITH_COT`
Description	Generate response using chain-of-thought reasoning
Research	Wei et al. 2022
Accuracy	+20-40% on reasoning
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `temperature` | number | 0.3 | Sampling temperature | | `max_tokens` | integer | 8192 | Maximum output tokens | | `thinking_budget` | integer | 2000 | Tokens for reasoning |

Inputs: `prompt` **Outputs:** `reasoning`, `response`

REFINE_RESPONSE

Attribute	Value
UI Name	Refine
Scientific Name	Iterative Refinement
Code	`REFINE_RESPONSE`
Description	Improve a response based on feedback
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `refinement_focus` | string | “all” | Focus area: all, accuracy, clarity, completeness | | `preserve_structure` | boolean | true | Maintain response structure |

Inputs: `response`, `feedback` **Outputs:** `refined_response`

Evaluation Methods

CRITIQUE_RESPONSE

Attribute	Value
UI Name	Critique
Scientific Name	Critical Evaluation
Code	`CRITIQUE_RESPONSE`
Description	Critically evaluate a response for flaws and improvements
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `focus_areas` | array | [“accuracy”, “completeness”, “clarity”, “logic”] | Areas to evaluate | | `severity_threshold` | string | “medium” | Minimum severity to report |

Inputs: `original_prompt`, `response` **Outputs:** `critique`, `issues[]`, `suggestions[]`

JUDGE_RESPONSES

Attribute	Value
UI Name	Judge
Scientific Name	Comparative Judgment
Code	`JUDGE_RESPONSES`
Description	Compare and judge multiple responses to select the best
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `evaluation_mode` | enum | “pairwise” | Mode: pointwise, pairwise, listwise | | `criteria` | array | [“accuracy”, “helpfulness”, “clarity”, “completeness”] | Evaluation criteria |

Inputs: `original_prompt`, `responses[]` **Outputs:** `best_index`, `score`, `reasoning`

POLL_JUDGE

Attribute	Value
UI Name	Multi-Judge Panel
Scientific Name	Panel of LLMs Evaluation
Code	`POLL_JUDGE`
Description	Multiple diverse judge models evaluate outputs independently
Research	Panel of LLMs Evaluation Framework
Accuracy	Reduces single-model bias 40-60%
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `num_judges` | integer | 3 | Number of judge models | | `scoring_criteria` | array | [“accuracy”, “completeness”, “clarity”] | Evaluation dimensions | | `aggregation` | enum | “mean” | Aggregation: mean, median, weighted |

Inputs: `original_prompt`, `response` **Outputs:** `scores[]`, `aggregate_score`, `per_judge_feedback[]`

G_EVAL

Attribute	Value
UI Name	Structured Scoring
Scientific Name	G-Eval NLG Evaluation Framework
Code	`G_EVAL`
Description	Chain-of-thought scoring for NLG across coherence, consistency, fluency, relevance
Research	G-Eval: NLG Evaluation using GPT-4
Accuracy	Correlates 0.5+ with human judgment
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `dimensions` | array | [“coherence”, “consistency”, “fluency”, “relevance”] | G-Eval dimensions | | `use_cot` | boolean | true | Chain-of-thought scoring | | `score_range` | array | [1, 5] | Score min/max |

Inputs: `source`, `generated` **Outputs:** `dimension_scores{}`, `overall_score`, `reasoning`

PAIRWISE_PREFER

Attribute	Value
UI Name	Head-to-Head Compare
Scientific Name	Pairwise Preference Judgment
Code	`PAIRWISE_PREFER`
Description	Compare two outputs head-to-head for reliable relative ranking
Research	Pairwise Preference Learning
Complexity	Simple

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `comparison_criteria` | array | [“quality”, “accuracy”, “helpfulness”] | Comparison dimensions | | `allow_tie` | boolean | true | Allow tie verdicts |

Inputs: `response_a`, `response_b` **Outputs:** `verdict` (A/B/TIE), `key_differentiator`

SELF_REFLECT

Attribute	Value
UI Name	Reflect
Scientific Name	Self-Reflection
Code	`SELF_REFLECT`
Description	AI reflects on its own response to identify improvements
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `reflection_depth` | string | “thorough” | Depth: quick, standard, thorough | | `aspects` | array | [“accuracy”, “completeness”, “clarity”] | Aspects to reflect on |

Inputs: `original_prompt`, `response` **Outputs:** `strengths[]`, `weaknesses[]`, `improvements[]`

COMPARE_ANALYSIS

Attribute	Value
UI Name	Side-by-Side Compare
Scientific Name	Comparative Analysis
Code	`COMPARE_ANALYSIS`
Description	Structured comparison highlighting differences and trade-offs
Accuracy	Decision clarity +50%
Complexity	Simple

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `comparison_dimensions` | array | [“pros”, “cons”, “use_cases”] | Dimensions to compare | | `include_recommendation` | boolean | true | Include final recommendation |

Inputs: `options[]` **Outputs:** `comparison_table`, `recommendation`, `reasoning`

Synthesis Methods

SYNTHESIZE_RESPONSES

Attribute	Value
UI Name	Synthesize
Scientific Name	Multi-Response Synthesis
Code	`SYNTHESIZE_RESPONSES`
Description	Combine best parts from multiple responses
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `combination_strategy` | string | “best_parts” | Strategy: best_parts, weighted, comprehensive | | `conflict_resolution` | string | “majority” | Conflict handling: majority, note, first |

Inputs: `original_prompt`, `responses[]` **Outputs:** `synthesized_response`

BUILD_CONSENSUS

Attribute	Value
UI Name	Consensus
Scientific Name	Consensus Aggregation
Code	`BUILD_CONSENSUS`
Description	Identify points of agreement across multiple responses
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `consensus_threshold` | number | 0.7 | Agreement threshold (0-1) | | `include_disputed` | boolean | true | Include disputed points |

Inputs: `responses[]` **Outputs:** `consensus_points[]`, `disputed_points[]`, `unique_insights[]`

MOA_LAYERS

Attribute	Value
UI Name	Layered Synthesis
Scientific Name	Mixture of Agents Multi-Layer
Code	`MOA_LAYERS`
Description	3-4 layers of proposer agents feeding into aggregators
Research	Together AI - Mixture of Agents
Accuracy	+8% over GPT-4o on AlpacaEval
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `num_layers` | integer | 3 | Number of synthesis layers (2-5) | | `proposers_per_layer` | integer | 3 | Proposers per layer | | `aggregator_model` | string | "anthropic/claude-3-5-sonnet-20241022" | Model for aggregation |

Inputs: `prompt` **Outputs:** `layer_outputs[]`, `final_response`

MULTI_SOURCE_SYNTH

Attribute	Value
UI Name	Combine & Summarize
Scientific Name	Multi-Source Synthesis
Code	`MULTI_SOURCE_SYNTH`
Description	Combine insights from multiple model responses
Accuracy	Comprehensive coverage +40%
Complexity	Simple

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `preserve_unique` | boolean | true | Preserve unique insights | | `conflict_handling` | string | "note" | Conflict handling: note, resolve, ignore | | `structure_output` | boolean | true | Structure the output |

Inputs: `responses[]` **Outputs:** `synthesized_response`, `conflicts[]`

LLM_BLENDER

Attribute	Value
UI Name	Rank & Merge Responses
Scientific Name	LLM-Blender Pairwise Ranking Fusion
Code	`LLM_BLENDER`

Attribute	Value
Description	PairRanker scores pairs, GenFusion merges top outputs
Research	ACL 2023 - LLM-Blender
Accuracy	+12% over best single model
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `num_responses` | integer | 5 | Responses to rank | | `top_k_for_fusion` | integer | 3 | Top K to fuse |

Inputs: `prompt`, `responses[]` **Outputs:** `rankings[]`, `fused_response`

TOKEN_AUCTION

Attribute	Value
UI Name	Fair Multi-Stakeholder Merge
Scientific Name	Token Auction Mechanism
Code	`TOKEN_AUCTION`
Description	Token-by-token auction for fair multi-stakeholder output
Research	WWW 2024 Best Paper - Token Auction
Complexity	Expert

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `budget_per_agent` | integer | 100 | Token budget per agent | | `auction_type` | string | “second_price” | Auction: second_price, first_price | | `min_bid` | integer | 1 | Minimum bid value |

Inputs: `prompt`, `stakeholder_preferences[]` **Outputs:** `merged_response`, `budget_usage[]`

Verification Methods

VERIFY_FACTS

Attribute	Value
UI Name	Fact Check
Scientific Name	Factual Verification
Code	`VERIFY_FACTS`
Description	Extract and verify factual claims in a response
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `extraction_method` | string | “explicit” | Method: explicit, implicit, all | | `verification_depth` | string | “thorough” | Depth: quick, standard, thorough |

Inputs: `response` **Outputs:** `claims[]`, `verifications[]`, `confidence_scores[]`

PROCESS_REWARD

Attribute	Value
UI Name	Step Verification
Scientific Name	Process Reward Model Verification
Code	`PROCESS_REWARD`
Description	Verify each reasoning step independently
Research	OpenAI ICLR 2024 - Process Reward Models
Accuracy	+6% on MATH benchmark
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `verify_each_step` | boolean | true | Verify each step | | `step_accuracy_threshold` | number | 0.7 | Accuracy threshold | | `regenerate_on_failure` | boolean | true | Regenerate failed steps |

Inputs: `problem`, `reasoning_steps[]` **Outputs:** `step_verdicts[]`, `overall_valid`, `failed_steps[]`

SELFCHECK_GPT

Attribute	Value
UI Name	Internal Consistency
Scientific Name	SelfCheckGPT Verification Pipeline
Code	`SELFCHECK_GPT`
Description	Generate N samples, cross-reference for inconsistencies
Research	SelfCheckGPT - Zero-Resource Hallucination Detection
Accuracy	Hallucination F1 +25%
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `sample_count` | integer | 5 | Consistency check samples | | `consistency_threshold` | number | 0.7 | Consistency threshold | | `check_method` | enum | “nli” | Method: nli, bertscore, exact |

Inputs: `claim`, `samples[]` **Outputs:** `consistency_score`, `inconsistent_claims[]`

CITE_VERIFY

Attribute	Value
UI Name	Source Attribution
Scientific Name	Citation Accuracy Verification
Code	`CITE_VERIFY`
Description	Trace claims to source passages, verify citations
Accuracy	Citation accuracy +40%
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `citation_match_threshold` | number | 0.8 | Match threshold | | `verify_quotes` | boolean | true | Verify exact quotes | | `check_context` | boolean | true | Check citation context |

Inputs: `response`, `sources[]` **Outputs:** `citation_verdicts[]`, `fabricated_citations[]`

NATURAL_LOGIC

Attribute	Value
UI Name	Logic-Based Fact Check
Scientific Name	Zero-Shot Natural Logic Verification
Code	`NATURAL_LOGIC`
Description	Use set-theoretic operators for logical consistency
Research	EMNLP 2024 - Zero-Shot Natural Logic
Accuracy	+8.96 accuracy points
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `operators` | array | [“subset”, “superset”, “negation”, “equivalence”] | Logic operators | | `require_proof` | boolean | true | Require formal proof |

Inputs: `premise`, `claim` **Outputs:** `relation`, `valid`, `proof`

UNIFACT

Attribute	Value
UI Name	Combined Verification
Scientific Name	UniFact Unified Verification
Code	`UNIFACT`
Description	Hybrid model-based and text-based verification

Attribute	Value
Research	UniFact 2024
Accuracy	Comprehensive verification +20%
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `methods` | array | [“semantic”, “textual”, “logical”] | Verification methods | | `combine_strategy` | string | “weighted” | Combination: weighted, majority, all |

Inputs: `claim` **Outputs:** `method_verdicts{}`, `combined_verdict`

EIGENSCORE

Attribute	Value
UI Name	Internal State Check
Scientific Name	EigenScore Hidden State Analysis
Code	`EIGENSCORE`
Description	Analyze eigenvalue patterns in hidden states for uncertainty
Research	ICLR 2024 - EigenScore
Complexity	Expert

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `threshold` | number | 0.6 | Uncertainty threshold | | `layer_indices` | array | [-1, -2, -3] | Layers to analyze | | `aggregate` | string | “mean” | Aggregation: mean, max, min |

Inputs: `hidden_states` **Outputs:** `uncertainty_score`, `layer_scores[]`

REQUERY_CHECK

Attribute	Value
UI Name	Re-Query Consistency
Scientific Name	Iterative Prompting Consistency Check
Code	`REQUERY_CHECK`
Description	Black-box detection via paraphrased prompts
Research	DeepMind NeurIPS 2024
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `num_rephrasings` | integer | 3 | Number of rephrasings | | `consistency_threshold` | number | 0.8 | Consistency threshold | | `rephrase_strategy` | string | “semantic” | Strategy: semantic, syntactic, mixed |

Inputs: `original_prompt` **Outputs:** `responses[]`, `consistency_score`, `inconsistencies[]`

Debate Methods

GENERATE_CHALLENGE

Attribute	Value
UI Name	Challenge
Scientific Name	Adversarial Challenge
Code	`GENERATE_CHALLENGE`
Description	Challenge a response by arguing the opposite position
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `challenge_intensity` | string | “moderate” | Intensity: mild, moderate, aggressive | | `focus` | string | “weakest_points” | Focus: weakest_points, all, random |

Inputs: `original_prompt`, `response` **Outputs:** `challenges[]`, `counter_arguments[]`

DEFEND_POSITION

Attribute	Value
UI Name	Defend
Scientific Name	Position Defense
Code	`DEFEND_POSITION`
Description	Defend a response against challenges
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `defense_strategy` | string | “address_all” | Strategy: address_all, strongest_only, concede_weak | | `concede_valid` | boolean | true | Concede valid challenges |

Inputs: `response`, `challenge` **Outputs:** `defense`, `concessions[]`, `improved_response`

SPARSE_DEBATE

Attribute	Value
UI Name	Efficient Debate
Scientific Name	Sparse Communication Topology Debate

Attribute	Value
Code	`SPARSE_DEBATE`
Description	Agents connect in sparse patterns (ring, star, tree) to reduce communication cost
Research	Sparse Communication Networks for Multi-Agent Debate
Accuracy	-40-60% cost with <5% quality loss
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `topology` | enum | "ring" | Network: ring, star, tree, full | | `debate_rounds` | integer | 3 | Number of debate rounds (1-10) | | `temperature` | number | 0.7 | Agent response temperature |

Inputs: `prompt` **Outputs:** `debate_history[]`, `final_position`, `consensus_reached`

ARG_MAPPING

Attribute	Value
UI Name	Attack & Support Mapping
Scientific Name	ArgLLMs Quantitative Bipolar Argumentation
Code	`ARG_MAPPING`
Description	Build explicit attack/support relations between arguments with strength scores
Research	Imperial College London 2024 - ArgLLMs
Accuracy	Structured argumentation +35%
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `strength_threshold` | number | 0.5 | Min argument strength to include | | `include_rebuttal` | boolean | true | Generate rebuttals | | `max_depth` | integer | 3 | Max argument tree depth |

Inputs: `claim` **Outputs:** `argument_graph`, `relations[]`, `strength_scores{}`

HAH_DELPHI

Attribute	Value
UI Name	Human-AI Expert Panel

Attribute	Value
Scientific Name	HAH-Delphi Human-AI Hybrid Consensus
Code	`HAH_DELPHI`
Description	Four-tier Delphi consensus combining AI with human expert oversight
Research	HAH-Delphi Aug 2025
Accuracy	>90% coverage on expert decisions
Complexity	Expert

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `tiers` | integer | 4 | Number of consensus tiers | | `human_threshold` | number | 0.6 | Escalate to human above this | | `consensus_target` | number | 0.9 | Target consensus level | | `max_rounds` | integer | 5 | Maximum Delphi rounds |

Inputs: `prompt`, `previous_consensus` **Outputs:** `consensus`, `confidence`, `human_escalated`

RECONCILE_WEIGHTED

Attribute	Value
UI Name	Confidence-Weighted Agreement
Scientific Name	ReConcile Confidence-Weighted Consensus
Code	`RECONCILE_WEIGHTED`
Description	Diverse LLMs weighted by verbalized confidence scores
Research	ACL 2024 - ReConcile
Accuracy	+15-25% on diverse model ensembles
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `min_confidence` | number | 0.6 | Minimum confidence to include | | `weight_by` | string | “confidence” | Weighting strategy | | `reconciliation_rounds` | integer | 2 | Reconciliation iterations |

Inputs: `prompt` **Outputs:** `weighted_response`, `confidence_scores[]`, `disagreements[]`

Aggregation Methods

MAJORITY_VOTE

Attribute	Value
UI Name	Vote
Scientific Name	Majority Aggregation
Code	`MAJORITY_VOTE`
Description	Select the most common answer from multiple responses
Complexity	Simple

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `vote_method` | string | “exact_match” | Method: exact_match, semantic, fuzzy | | `tie_breaker` | string | “first” | Tie breaker: first, random, longest |

Inputs: `responses[]` **Outputs:** `winner`, `vote_counts{}`, `confidence`

WEIGHTED_AGGREGATE

Attribute	Value
UI Name	Weight
Scientific Name	Weighted Aggregation
Code	`WEIGHTED_AGGREGATE`
Description	Combine responses weighted by confidence/expertise
Complexity	Simple

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `weight_by` | string | “confidence” | Weight source: confidence, expertise, accuracy | | `normalize` | boolean | true | Normalize weights |

Inputs: `responses[]`, `weights[]` **Outputs:** `aggregated_response`, `contribution_scores[]`

SELF_CONSISTENCY

Attribute	Value
UI Name	Multi-Sample Voting
Scientific Name	Self-Consistency Decoding
Code	`SELF_CONSISTENCY`
Description	Generate 5-20 reasoning paths, majority vote on final answers
Research	Wang et al. 2022 - Self-Consistency
Accuracy	+17.9% on GSM8K
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `sample_count` | integer | 5 | Number of reasoning paths (3-20) | | `temperature` | number | 0.7 | Sampling temperature | | `vote_method` | string | “majority” | Vote method: majority, weighted | | `extract_answer` | boolean | true | Extract final answer |

Inputs: `prompt` **Outputs:** `reasoning_paths[]`, `final_answer`, `confidence`

GEDI_VOTE

Attribute	Value
UI Name	Ranked Choice Voting
Scientific Name	GEDI Electoral Collective Decision Making
Code	`GEDI_VOTE`
Description	Ordinal preferential voting with 3+ agents
Research	EMNLP 2024 - GEDI Electoral CDM
Accuracy	Consensus +30%
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `num_agents` | integer | 3 | Number of voting agents | | `ranking_depth` | integer | 3 | Rankings per agent | | `elimination_rounds` | boolean | true | Use elimination rounds |

Inputs: `options[]` **Outputs:** `winner`, `round_results[]`, `final_rankings[]`

Reasoning Methods

DECOMPOSE_PROBLEM

Attribute	Value
UI Name	Decompose
Scientific Name	Problem Decomposition
Code	`DECOMPOSE_PROBLEM`
Description	Break down a complex problem into sub-problems
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `max_subproblems` | integer | 5 | Maximum sub-problems | | `decomposition_strategy` | string | “functional” | Strategy: functional, hierarchical, sequential |

Inputs: `prompt` **Outputs:** `subproblems[]`, `dependencies[]`, `complexity_estimates[]`

LOGIC_LM

Attribute	Value
UI Name	Translate to Logic & Solve
Scientific Name	Logic-LM Neuro-Symbolic Reasoning
Code	`LOGIC_LM`
Description	Convert to formal logic, solve externally, translate back
Research	EMNLP 2023 - Logic-LM
Accuracy	+39.2% over standard prompting
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `target_logic` | string | "prolog" | Target: prolog, z3, fol | | `solver` | string | "swi-prolog" | External solver | | `translate_back` | boolean | true | Translate result to natural language |

Inputs: `problem` **Outputs:** `formal_representation`, `solver_output`, `natural_answer`

LLM_MODULO

Attribute	Value
UI Name	Generate & Verify Loop
Scientific Name	LLM-Modulo Framework
Code	`LLM_MODULO`
Description	Generate candidates, validate with external critics, iterate
Research	ICML 2024 Spotlight - LLM-Modulo
Accuracy	12%→93.9% plan success
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `max_iterations` | integer | 5 | Maximum iterations | | `critics` | array | ["syntax", "semantic", "constraint"] | Critic types | | `require_all_pass` | boolean | true | All critics must pass |

Inputs: `problem` **Outputs:** `solution`, `iterations_used`, `critic_feedback[]`

Routing Methods

DETECT_TASK_TYPE

Attribute	Value
UI Name	Classify
Scientific Name	Task Classification

Attribute	Value
Code	`DETECT_TASK_TYPE`
Description	Analyze prompt to determine task type and complexity
Complexity	Simple

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `task_categories` | array | [“coding”, “reasoning”, “creative”, “factual”, “math”, “research”] | Task categories |

Inputs: `prompt` **Outputs:** `task_type`, `complexity`, `capabilities_required[]`

SELECT_BEST_MODEL

Attribute	Value
UI Name	Route
Scientific Name	Model Selection
Code	`SELECT_BEST_MODEL`
Description	Choose the optimal model for a given task
Complexity	Simple

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `consider_cost` | boolean | true | Factor in cost | | `consider_latency` | boolean | true | Factor in latency | | `quality_priority` | number | 0.7 | Quality weight (0-1) |

Inputs: `task_type`, `complexity`, `constraints` **Outputs:** `selected_model`, `score`, `alternatives[]`

ROUTELLM

Attribute	Value
UI Name	Smart Model Selection
Scientific Name	RouteLLM Adaptive Selection
Code	`ROUTELLM`
Description	Trained router predicts which model answers correctly
Research	LMSYS RouteLLM
Accuracy	-50% cost, <3% quality loss
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `router_model` | enum | “matrix_factorization” | Router: matrix_factorization, bert, causal_lm |

| `cost_threshold` | number | 0.7 | Max cost relative to baseline | | `quality_floor` | number | 0.8 | Minimum acceptable quality |

Inputs: `prompt` **Outputs:** `selected_model`, `confidence`, `routing_reason`

FRUGAL_CASCADE

Attribute	Value
UI Name	Progressive Escalation
Scientific Name	FrugalGPT Cascading Selection
Code	`FRUGAL_CASCADE`
Description	Try cheap models first, escalate on low confidence
Research	FrugalGPT 2023
Accuracy	-90% cost, maintained quality
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `model_cascade` | array | [“gpt-4o-mini”, “gpt-4o”, “o1”] | Models in escalation order | | `confidence_threshold` | number | 0.85 | Escalate below this confidence | | `max_escalations` | integer | 2 | Maximum escalation steps |

Inputs: `prompt` **Outputs:** `response`, `model_used`, `escalations_used`

PARETO_ROUTE

Attribute	Value
UI Name	Budget-Aware Routing
Scientific Name	Cost-Quality Pareto Routing
Code	`PARETO_ROUTE`
Description	Route on Pareto-optimal cost/quality trade-off
Research	Pareto-Optimal Model Selection
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `budget_cents` | number | 10 | Budget constraint per query | | `quality_weight` | number | 0.7 | Weight for quality (0-1) | | `latency_weight` | number | 0.1 | Weight for latency (0-1) |

Inputs: `prompt`, `budget` **Outputs:** `selected_model`, `expected_quality`, `expected_cost`

C3PO_CASCADE

Attribute	Value
UI Name	Smart Cost Escalation
Scientific Name	C3PO Self-Supervised Cascade
Code	`C3PO_CASCADE`
Description	Self-supervised cascade learning query difficulty
Research	NeurIPS 2024 - C3PO
Accuracy	-40% cost, +2% quality
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `cascade_levels` | integer | 3 | Number of model tiers | | `self_supervised` | boolean | true | Enable self-supervised learning | | `calibration_samples` | integer | 100 | Samples for difficulty calibration |

Inputs: `prompt` **Outputs:** `response`, `difficulty_score`, `tier_used`

AUTOMIX

Attribute	Value
UI Name	Self-Routing Selection
Scientific Name	AutoMix POMDP Routing
Code	`AUTOMIX`
Description	POMDP-based self-routing by task difficulty
Research	Nov 2025 - AutoMix
Complexity	Expert

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `pomdp_horizon` | integer | 3 | POMDP planning horizon | | `exploration_rate` | number | 0.1 | for -greedy exploration | | `self_verification` | boolean | true | Verify own outputs |

Inputs: `prompt` **Outputs:** `response`, `belief_state`, `action_taken`

AFLOW_MCTS

Attribute	Value
UI Name	Auto-Discover Best Workflow
Scientific Name	AFlow MCTS Workflow Discovery
Code	`AFLOW_MCTS`
Description	MCTS to discover optimal workflow compositions
Research	ICLR 2025 - AFlow
Complexity	Expert

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `search_iterations` | integer | 100 | MCTS iterations | | `exploration_weight` | number | 1.414 | UCB exploration constant | | `max_depth` | integer | 5 | Max workflow depth |

Inputs: `task_description` **Outputs:** `discovered_workflow`, `expected_performance`, `search_tree`

Uncertainty Methods

SEMANTIC_ENTROPY

Attribute	Value
UI Name	Meaning-Based Uncertainty
Scientific Name	Semantic Entropy Quantification
Code	`SEMANTIC_ENTROPY`
Description	Cluster semantically equivalent answers, compute entropy over meaning clusters
Research	Nature 2024 - Semantic Uncertainty in LLMs
Accuracy	AUROC 0.79-0.87 hallucination detection
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `sample_count` | integer | 10 | Number of response samples (5-20) | | `temperature` | number | 0.7 | Sampling temperature | | `clustering_method` | enum | “nli” | Clustering: nli, embedding, exact | | `entropy_threshold` | number | 0.5 | Flag uncertainty above this |

Inputs: `prompt` **Outputs:** `entropy_score`, `clusters[]`, `uncertainty_flag`

SE_PROBES

Attribute	Value
UI Name	Fast Uncertainty Check
Scientific Name	Semantic Entropy Probes
Code	`SE_PROBES`
Description	Lightweight probes on hidden states for fast entropy estimation (logprob-based)
Research	ICML 2024 - Semantic Entropy Probes
Accuracy	300x faster, 90% accuracy
Complexity	Expert

Parameters: | Parameter | Type | Default | Description | |———–|——|———|————-| | `probe_layers` | array | [-1, -2] | Model layers to probe (logprob-based) | | `threshold` | number | 0.5 | Uncertainty threshold | | `fast_mode` | boolean | true | Use fast logprob estimation | | `sample_count` | integer | 5 | Number of samples for averaging |

Inputs: `prompt` **Outputs:** `entropy_estimate`, `layer_entropies[]`, `uncertainty_flag`

KERNEL_ENTROPY

Attribute	Value
UI Name	Detailed Uncertainty Score
Scientific Name	Kernel Language Entropy
Code	`KERNEL_ENTROPY`
Description	Continuous entropy via kernel density estimation on embeddings
Research	NeurIPS 2024 - Kernel Language Entropy
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |———–|——|———|————-| | `kernel` | enum | “rbf” | Kernel: rbf, linear, polynomial | | `bandwidth` | string | “auto” | Bandwidth or “auto” for Silverman | | `sample_count` | integer | 10 | Response samples for KDE |

Inputs: `prompt` **Outputs:** `kde_entropy`, `density_estimate`, `bandwidth_used`

CALIBRATED_CONF

Attribute	Value
UI Name	Calibrated Confidence
Scientific Name	Calibrated Confidence Estimation
Code	`CALIBRATED_CONF`
Description	Elicit confidence via prompting and calibrate against accuracy
Research	Calibrated Confidence Estimation Research
Accuracy	ECE -15%
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |———–|——|———|————-| | `calibration_method` | enum | “platt_scaling” | Method: platt_scaling, isotonic, temperature_scaling | | `confidence_prompt` | string | “verbalized” | How to elicit confidence | | `temperature` | number | 0.3 | Sampling temperature |

Inputs: `prompt` **Outputs:** `response`, `raw_confidence`, `calibrated_confidence`

CONSISTENCY_UQ

Attribute	Value
UI Name	Agreement Scoring
Scientific Name	Consistency-Based Uncertainty Quantification
Code	`CONSISTENCY_UQ`
Description	Measure agreement across samples as uncertainty proxy
Research	Consistency-Based UQ Research
Complexity	Simple

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `sample_count` | integer | 5 | Number of response samples | | `agreement_metric` | enum | "jaccard" | Metric: jaccard, cosine, exact_match, bertscore | | `threshold` | number | 0.7 | Agreement threshold |

Inputs: `prompt` **Outputs:** `agreement_score`, `responses[]`, `uncertainty_flag`

CONFORMAL_PRED

Attribute	Value
UI Name	Guaranteed Accuracy Bounds
Scientific Name	Enhanced Conformal Prediction
Code	`CONFORMAL_PRED`
Description	Prediction sets with statistical guarantees on coverage
Research	NeurIPS 2024 - Conformal Prediction for LLMs
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `coverage_target` | number | 0.9 | Target coverage (0.5-0.99) | | `calibration_size` | integer | 500 | Calibration set size | | `adaptive` | boolean | true | Use adaptive conformal sets |

Inputs: `prompt` **Outputs:** `prediction_set[]`, `coverage_guarantee`, `set_size`

Hallucination Detection Methods

MULTI_HALLUC

Attribute	Value
UI Name	Fact-Check Scanner
Scientific Name	Multi-Method Hallucination Detection
Code	`MULTI_HALLUC`
Description	Ensemble detection: consistency, attribution, semantic entropy
Research	Multi-Method Hallucination Detection 2025
Accuracy	F1 0.85+
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `methods` | array | [“consistency”, “attribution”, “semantic_entropy”] | Detection methods | | `aggregation` | enum | “weighted” | Aggregation: weighted, majority, any | | `flag_threshold` | number | 0.6 | Flag as hallucination above this |

Inputs: `response` **Outputs:** `hallucination_score`, `method_scores{}`, `flagged_claims[]`

METAQA

Attribute	Value
UI Name	Mutation Testing
Scientific Name	MetaQA Metamorphic Testing
Code	`METAQA`
Description	Test consistency via semantically equivalent transformations
Research	MetaQA Metamorphic Testing 2025
Accuracy	Subtle inconsistencies +30%
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `transformations` | array | [“paraphrase”, “negation”, “entity_swap”] | Mutation types | | `num_mutations` | integer | 3 | Mutations per claim | | `consistency_threshold` | number | 0.8 | Consistency threshold |

Inputs: `original_prompt` **Outputs:** `mutations[]`, `responses[]`, `inconsistencies[]`

FACTUAL_GROUND

Attribute	Value
UI Name	Source Verification

Attribute	Value
Scientific Name	Factual Grounding Verification
Code	`FACTUAL_GROUND`
Description	Verify claims against retrieved documents with evidence mapping
Research	Factual Grounding Research 2025
Accuracy	Grounding accuracy +45%
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `retrieval_top_k` | integer | 5 | Documents to retrieve | | `evidence_threshold` | number | 0.7 | Evidence support threshold | | `require_explicit_support` | boolean | true | Require explicit evidence |

Inputs: `claim`, `documents[]` **Outputs:** `verdict`, `evidence_mapping[]`, `ungrounded_claims[]`

Human-in-the-Loop Methods

HITL_REVIEW

Attribute	Value
UI Name	Human Review Queue
Scientific Name	Human-in-the-Loop Review System
Code	`HITL_REVIEW`
Description	Route low-confidence or high-stakes outputs to human review
Research	Human-in-the-Loop ML Systems
Accuracy	Critical error prevention +90%
Complexity	Simple

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `confidence_threshold` | number | 0.7 | Route to human below this | | `stake_level` | enum | “medium” | Stake: low, medium, high, critical | | `auto_approve_above` | number | 0.95 | Auto-approve above this confidence | | `queue_priority` | enum | “fifo” | Queue ordering: fifo, priority, lifo |

Inputs: `response`, `confidence`, `context` **Outputs:** `queued`, `queue_position`, `estimated_wait`

TIERED_EVAL

Attribute	Value
UI Name	Multi-Level Review
Scientific Name	Tiered Evaluation Architecture

Attribute	Value
Code	`TIERED_EVAL`
Description	Multi-tier: AI auto → AI flag → human → expert
Research	Tiered Evaluation Architecture
Complexity	Moderate

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `tiers` | array | [“auto”, “ai_flag”, “human”, “expert”] | Evaluation tiers | | `escalation_criteria` | string | “confidence” | Escalation trigger | | `sla_hours` | integer | 24 | SLA for human review |

Inputs: `response`, `context` **Outputs:** `tier_used`, `approvals[]`, `final_decision`

ACTIVE_SAMPLE

Attribute	Value
UI Name	Smart Sampling
Scientific Name	Active Learning Sample Selection
Code	`ACTIVE_SAMPLE`
Description	Select most informative samples for human labeling
Research	Active Learning for NLP
Accuracy	Labeling efficiency +60%
Complexity	Advanced

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `selection_strategy` | enum | “uncertainty” | Strategy: uncertainty, diversity, hybrid | | `batch_size` | integer | 10 | Samples per batch | | `diversity_weight` | number | 0.3 | Diversity in selection |

Inputs: `candidate_pool[]` **Outputs:** `selected_samples[]`, `selection_reasons[]`

Collaboration Methods

ECON_NASH

Attribute	Value
UI Name	No-Communication Coordination
Scientific Name	ECON Bayesian Nash Equilibrium
Code	`ECON_NASH`
Description	Agents coordinate without message exchange using game theory
Research	ICML 2025 - ECON
Accuracy	+11.2% coordination, -21.4% resources

Attribute	Value
Complexity	Expert

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `num_agents` | integer | 3 | Number of agents | | `equilibrium_type` | string | “bayesian_nash” | Equilibrium type | | `utility_function` | string | “cooperative” | Utility: cooperative, competitive |

Inputs: `prompt` **Outputs:** `coordinated_response`, `equilibrium_reached`, `agent_strategies[]`

Neural Methods

CATO_NEURAL

Attribute	Value
UI Name	Neural Decision
Scientific Name	Cato Neural Decision Engine
Code	`CATO_NEURAL`
Description	Integrates Cato safety pipeline with consciousness affect state and predictive coding for neural-informed decisions. Uses Control Barrier Functions for safety, affect-to-hyperparameter mapping for dynamic behavior, and active inference for uncertainty handling.
Research	RADIANT Cato Safety Architecture + Active Inference
Complexity	Expert

Parameters: | Parameter | Type | Default | Description | |————|——|———|————-| | `safety_mode` | enum | “enforce” | CBF mode: enforce, warn, monitor | | `use_affect_mapping` | boolean | true | Map affect to hyperparameters | | `use_predictive_coding` | boolean | true | Enable active inference | | `precision_governor_enabled` | boolean | true | Limit confidence by epistemic state | | `cbf_threshold` | number | 0.95 | Safety barrier threshold (0.8-1.0) | | `affect_influence.frustration_temperature_scale` | number | 0.2 | Temperature reduction when frustrated | | `affect_influence.curiosity_exploration_boost` | number | 0.3 | Exploration increase when curious | | `affect_influence.low_efficacy_escalation` | boolean | true | Escalate on low self-efficacy | | `prediction_config.generate_predictions` | boolean | true | Generate predictions | | `prediction_config.track_surprise` | boolean | true | Track surprise | | `prediction_config.learning_threshold` | number | 0.5 | Surprise threshold for learning | | `escalation_config.auto_escalate_on_uncertainty` | boolean | true | Auto-escalate on uncertainty | | `escalation_config.uncertainty_threshold` | number | 0.7 | Uncertainty threshold | | `escalation_config.human_escalation_enabled` | boolean | true | Enable human escalation |

Inputs: `prompt`, `context`, `affect_state` **Outputs:** `response`, `safety_verdict`, `hyperparameters_used`, `predictions[]`

System Workflows

All 49 system workflows are protected—admins can only modify configuration and enabled status, not workflow definitions.

Adversarial & Validation

ARE - Red Team Attack

Attribute	Value
UI Name	Red Team Attack
Scientific Name	Adversarial Robustness Evaluation
Code	`ARE`
Category	Adversarial & Validation
Description	One AI probes another for vulnerabilities, safety failures, and edge cases
Quality Improvement	Identifies 80-95% of vulnerabilities
Latency	High
Cost	High
Min Models	2

Best For: `security_testing`, `safety_validation`, `edge_case_discovery`, `robustness_testing`
Problem Indicators: `safety_critical`, `needs_validation`, `security_concern`, `untrusted_input`

LM_VS_LM - Cross-Examination

Attribute	Value
UI Name	Cross-Examination
Scientific Name	LM vs LM Factual Verification
Code	`LM_VS_LM`
Category	Adversarial & Validation
Description	Interrogator AI repeatedly questions responder AI's claims to expose inconsistencies and hallucinations
Quality Improvement	Reduces hallucinations by 40-60%
Latency	High
Cost	High

Attribute	Value
Min Models	2

Best For: `fact_checking`, `claim_verification`, `hallucination_detection`, `interview_simulation`
Problem Indicators: `factual_claims`, `needs_verification`, `potential_hallucination`, `complex_reasoning`

Debate & Deliberation

SOD - AI Debate

Attribute	Value
UI Name	AI Debate
Scientific Name	Scalable Oversight via Debate
Code	`SOD`
Category	Debate & Deliberation
Description	Two AIs argue opposing positions to convince a judge; truthful arguments should win
Quality Improvement	Improves decision quality by 25-35%
Latency	Very High
Cost	Very High
Min Models	3

Best For: `controversial_topics`, `decision_making`, `policy_analysis`, `ethical_dilemmas`
Problem Indicators: `multiple_viewpoints`, `controversial`, `needs_balanced_view`, `complex_decision`

MDA - Multi-Agent Debate

Attribute	Value
UI Name	Multi-Agent Debate
Scientific Name	Multiagent Deliberative Alignment
Code	`MDA`
Category	Debate & Deliberation
Description	Multiple LLM instances propose, critique, and refine until consensus
Quality Improvement	Consensus quality +30-45%
Latency	Very High
Cost	Very High
Min Models	3

Best For: `complex_problems`, `consensus_building`, `brainstorming`, `research_synthesis` **Problem Indicators:** `needs_consensus`, `multiple_approaches`, `collaborative_task`, `complex_problem`

ReConcile - Round Table Consensus

Attribute	Value
UI Name	Round Table Consensus
Scientific Name	Reconciled Ensemble Deliberation
Code	`ReConcile`
Category	Debate & Deliberation
Description	Heterogeneous models from different providers reconcile viewpoints iteratively
Quality Improvement	Reduces provider bias by 50-70%
Latency	Very High
Cost	High
Min Models	3

Best For: `cross_provider_synthesis`, `bias_reduction`, `comprehensive_analysis`, `balanced_output` **Problem Indicators:** `provider_bias_concern`, `needs_diversity`, `comprehensive_coverage`, `balanced_perspective`

Judge & Critic

LAAJE - AI Judge

Attribute	Value
UI Name	AI Judge
Scientific Name	LLM-as-a-Judge Evaluation
Code	`LAAJE`
Category	Judge & Critic
Description	Designated AI evaluates outputs using pointwise, pairwise, or listwise modes
Quality Improvement	Evaluation accuracy 85-95%
Latency	Medium
Cost	Medium
Min Models	2

Best For: `quality_evaluation`, `comparison`, `ranking`, `selection` **Problem Indicators:** `multiple_options`, `needs_ranking`, `quality_assessment`, `best_selection`

RLAIF - Constitutional Critic

Attribute	Value
UI Name	Constitutional Critic
Scientific Name	Reinforcement Learning from AI Feedback
Code	`RLAIF`
Category	Judge & Critic
Description	AI critiques/revises against explicit principles; Constitutional AI pattern
Quality Improvement	Alignment improvement 60-80%
Latency	High
Cost	Medium
Min Models	2

Best For: `safety_alignment`, `policy_compliance`, `ethical_review`, `guideline_adherence` **Problem Indicators:** `needs_alignment`, `policy_check`, `ethical_concern`, `compliance_required`

IREF - Critique-Revise Loop

Attribute	Value
UI Name	Critique-Revise Loop
Scientific Name	Iterative Refinement with External Feedback
Code	`IREF`
Category	Judge & Critic
Description	Generator → Critic identifies flaws → Generator revises; repeats until quality threshold
Quality Improvement	Quality improvement per iteration: 15-25%
Latency	High
Cost	High
Min Models	2

Best For: `iterative_improvement`, `quality_refinement`, `error_correction`, `polish` **Problem Indicators:** `needs_refinement`, `quality_critical`, `iterative_task`, `perfectionist`

Ensemble & Aggregation

SCMR - Majority Vote

Attribute	Value
UI Name	Majority Vote
Scientific Name	Self-Consistency via Marginal Reasoning
Code	`SCMR`
Category	Ensemble & Aggregation
Description	Same prompt to N instances, select most common answer
Quality Improvement	+15-25% accuracy on factual tasks
Latency	Medium
Cost	Medium
Min Models	3

Best For: `factual_questions`, `multiple_choice`, `classification`, `simple_reasoning` **Problem Indicators:** `objective_answer`, `clear_correct_answer`, `factual_query`, `classification_task`

CWMA - Weighted Ensemble

Attribute	Value
UI Name	Weighted Ensemble
Scientific Name	Confidence-Weighted Model Aggregation
Code	`CWMA`
Category	Ensemble & Aggregation
Description	Weight model contributions by confidence, accuracy, or domain expertise
Quality Improvement	+20-35% over simple averaging
Latency	Medium
Cost	Medium
Min Models	3

Best For: `domain_expertise`, `confidence_critical`, `weighted_synthesis`, `expert_combination` **Problem Indicators:** `domain_specific`, `expertise_required`, `confidence_matters`, `specialized_knowledge`

SMoE - Mixture Router

Attribute	Value
UI Name	Mixture Router
Scientific Name	Sparse Mixture-of-Experts Routing

Attribute	Value
Code	`SMoE`
Category	Ensemble & Aggregation
Description	Lightweight router selects specialist AI(s) per input
Quality Improvement	Cost reduction 40-60% with same quality
Latency	Low
Cost	Low
Min Models	2

Best For: `routing`, `specialization`, `efficiency`, `domain_detection` **Problem Indicators:** `unknown_domain`, `needs_specialist`, `efficiency_critical`, `variable_task_type`

Reflection & Self-Improvement

ISFR - Self-Refine Loop

Attribute	Value
UI Name	Self-Refine Loop
Scientific Name	Iterative Self-Feedback Refinement
Code	`ISFR`
Category	Reflection & Self-Improvement
Description	AI generates → self-critiques → refines until satisfactory
Quality Improvement	+20-30% quality per iteration
Latency	High
Cost	Medium
Min Models	1

Best For: `writing`, `code_improvement`, `iterative_tasks`, `quality_improvement` **Problem Indicators:** `needs_polish`, `iterative_improvement`, `quality_critical`, `refinement_needed`

VRL - Reflexion Agent

Attribute	Value
UI Name	Reflexion Agent
Scientific Name	Verbal Reinforcement Learning
Code	`VRL`
Category	Reflection & Self-Improvement

Attribute	Value
Description	Agent reflects on failures, stores insights in episodic memory, improves without gradients
Quality Improvement	+30-50% on repeated tasks
Latency	High
Cost	Medium
Min Models	1

Best For: `agentic_tasks`, `learning_from_failure`, `adaptive_behavior`, `long_term_improvement`
Problem Indicators: `repeated_task`, `learning_opportunity`, `failure_recovery`, `adaptive_needed`

LATS - Tree Search Reasoning

Attribute	Value
UI Name	Tree Search Reasoning
Scientific Name	Language Agent Tree Search
Code	`LATS`
Category	Reflection & Self-Improvement
Description	Monte-Carlo tree search exploring reasoning paths with backpropagation
Quality Improvement	4%→74% on puzzle tasks
Latency	Very High
Cost	Very High
Min Models	1

Best For: `complex_reasoning`, `planning`, `search_problems`, `optimization` **Problem Indicators:** `search_problem`, `multiple_paths`, `optimization`, `complex_planning`

Verification & Fact-Checking

CoVe - Chain of Verification

Attribute	Value
UI Name	Chain of Verification
Scientific Name	Stepwise Verification Prompting
Code	`CoVe`
Category	Verification & Fact-Checking
Description	Draft → generate verification questions → answer independently → verified output

Attribute	Value
Quality Improvement	Reduces factual errors by 30-50%
Latency	High
Cost	Medium
Min Models	1

Best For: `fact_checking`, `claim_verification`, `accuracy_critical`, `research` **Problem Indicators:** `factual_claims`, `needs_verification`, `accuracy_critical`, `research_output`

SelfRAG - Retrieval-Augmented Verification

Attribute	Value
UI Name	Retrieval-Augmented Verification
Scientific Name	Self-Reflective RAG
Code	`SelfRAG`
Category	Verification & Fact-Checking
Description	AI self-critiques, fetches documents if needed, validates against evidence
Quality Improvement	Factual accuracy +40-60%
Latency	High
Cost	Medium
Min Models	1

Best For: `research`, `fact_checking`, `document_based`, `evidence_required` **Problem Indicators:** `needs_sources`, `research_task`, `evidence_based`, `document_analysis`

Multi-Agent Collaboration

LLM_MAS - Agent Team

Attribute	Value
UI Name	Agent Team
Scientific Name	LLM-based Multi-Agent Systems
Code	`LLM_MAS`
Category	Multi-Agent Collaboration
Description	Specialized agents with distinct roles collaborate via natural language
Quality Improvement	Complex task completion +40-60%
Latency	Very High
Cost	High
Min Models	3

Best For: `complex_projects`, `multi_skill`, `collaborative`, `project_management` **Problem Indicators:** `multi_disciplinary`, `complex_project`, `needs_coordination`, `diverse_skills`

MAPR - Peer Review Pipeline

Attribute	Value
UI Name	Peer Review Pipeline
Scientific Name	Multi-Agent Peer Review
Code	`MAPR`
Category	Multi-Agent Collaboration
Description	Sequential review chain where each agent reviews prior agent's work
Quality Improvement	Error reduction 50-70%
Latency	High
Cost	High
Min Models	3

Best For: `document_review`, `quality_assurance`, `sequential_improvement`, `editorial` **Problem Indicators:** `needs_review`, `quality_critical`, `sequential_task`, `editorial_process`

Reasoning Enhancement

CoT - Chain-of-Thought

Attribute	Value
UI Name	Chain-of-Thought
Scientific Name	CoT Prompting
Code	`CoT`
Category	Reasoning Enhancement
Description	Step-by-step reasoning before final answer
Quality Improvement	+20-40% on math/logic
Latency	Medium
Cost	Medium
Min Models	1

Best For: `math`, `logic`, `reasoning`, `problem_solving` **Problem Indicators:** `requires_reasoning`, `multi_step`, `logical_problem`, `math_problem`

ZeroShotCoT - Zero-Shot CoT

Attribute	Value
UI Name	Zero-Shot CoT
Scientific Name	"Let's think step by step"
Code	`ZeroShotCoT`
Category	Reasoning Enhancement
Description	Add "Let's think step by step" to prompt without examples
Quality Improvement	+15-30% without examples
Latency	Low
Cost	Low
Min Models	1

Best For: `general_reasoning`, `quick_improvement`, `no_examples_available` **Problem Indicators:** `reasoning_needed`, `no_examples`, `general_question`

ToT - Tree-of-Thoughts

Attribute	Value
UI Name	Tree-of-Thoughts
Scientific Name	ToT with BFS/DFS
Code	`ToT`
Category	Reasoning Enhancement
Description	Explore multiple reasoning paths with breadth/depth-first search
Quality Improvement	4%→74% on puzzles
Latency	Very High
Cost	Very High
Min Models	1

Best For: `puzzles`, `creative_writing`, `planning`, `exploration` **Problem Indicators:** `multiple_solutions`, `creative_task`, `exploration_needed`, `puzzle`

GoT - Graph-of-Thoughts

Attribute	Value
UI Name	Graph-of-Thoughts
Scientific Name	GoT Synthesis
Code	`GoT`
Category	Reasoning Enhancement
Description	Thought units as graph nodes with arbitrary connections

Attribute	Value
Quality Improvement	+62% over ToT on sorting
Latency	Very High
Cost	Very High
Min Models	1

Best For: `complex_synthesis`, `interconnected_reasoning`, `sorting`, `complex_logic` **Problem Indicators:** `complex_relationships`, `synthesis_needed`, `interconnected_concepts`

ReAct - Reasoning + Acting

Attribute	Value
UI Name	ReAct
Scientific Name	Reasoning + Acting
Code	`ReAct`
Category	Reasoning Enhancement
Description	Interleave reasoning and acting with external tools
Quality Improvement	+34% on interactive tasks
Latency	High
Cost	Medium
Min Models	1

Best For: `tool_use`, `interactive_tasks`, `research`, `agentic` **Problem Indicators:** `needs_tools`, `interactive`, `external_data`, `agentic_task`

L2M - Least-to-Most

Attribute	Value
UI Name	Least-to-Most
Scientific Name	Decomposition Prompting
Code	`L2M`
Category	Reasoning Enhancement
Description	Decompose problem into subproblems, solve smallest first
Quality Improvement	16%→99% on SCAN
Latency	High
Cost	Medium
Min Models	1

Best For: `compositional`, `hierarchical`, `step_building` **Problem Indicators:** `compositional_task`, `can_decompose`, `builds_on_previous`

PS - Plan-and-Solve

Attribute	Value
UI Name	Plan-and-Solve
Scientific Name	Explicit Planning
Code	`PS`
Category	Reasoning Enhancement
Description	Devise plan then execute step by step
Quality Improvement	Matches 8-shot CoT
Latency	Medium
Cost	Medium
Min Models	1

Best For: `complex_tasks`, `planning`, `structured_problems` **Problem Indicators:** `needs_planning`, `complex_execution`, `structured_approach`

MCP - Metacognitive Prompting

Attribute	Value
UI Name	Metacognitive Prompting
Scientific Name	5-stage reflection
Code	`MCP`
Category	Reasoning Enhancement
Description	Understand, decompose, execute, self-verify, refine
Quality Improvement	Beats CoT on NLU
Latency	High
Cost	Medium
Min Models	1

Best For: `nlu`, `comprehension`, `thorough_analysis` **Problem Indicators:** `comprehension_critical`, `needs_verification`, `thorough_needed`

PoT - Program-of-Thought

Attribute	Value
UI Name	Program-of-Thought
Scientific Name	Code-based Reasoning
Code	`PoT`

Attribute	Value
Category	Reasoning Enhancement
Description	Generate code to solve math problems
Quality Improvement	For mathematical computation
Latency	Medium
Cost	Low
Min Models	1

Best For: `math`, `computation`, `algorithmic` **Problem Indicators:** `mathematical`, `needs_computation`, `algorithmic_solution`

Model Routing Strategies

SINGLE - Single Model

Attribute	Value
UI Name	Single Model
Scientific Name	Primary model only
Code	`SINGLE`
Category	Model Routing Strategies
Description	Route to single best model for fastest response
Quality Improvement	Fastest, lowest cost
Latency	Low
Cost	Low
Min Models	1

Best For: `simple_tasks`, `speed_critical`, `cost_sensitive` **Problem Indicators:** `simple_task`, `speed_priority`, `cost_priority`

ENSEMBLE - Ensemble

Attribute	Value
UI Name	Ensemble
Scientific Name	Query multiple, synthesize
Code	`ENSEMBLE`
Category	Model Routing Strategies
Description	Query multiple models and synthesize results with conflict detection
Quality Improvement	Best overall quality
Latency	High
Cost	High

Attribute	Value
Min Models	3

Best For: `important_decisions`, `quality_critical`, `diverse_perspectives` **Problem Indicators:** `quality_priority`, `needs_diversity`, `important_task`

CASCADE - Cascade

Attribute	Value
UI Name	Cascade
Scientific Name	Escalate on low confidence
Code	`CASCADE`
Category	Model Routing Strategies
Description	Start with cheap model, escalate to better if confidence below threshold
Quality Improvement	Cost reduction 40-60%
Latency	Variable
Cost	Low
Min Models	2

Best For: `variable_complexity`, `cost_optimization`, `adaptive` **Problem Indicators:** `unknown_complexity`, `cost_conscious`, `adaptive_quality`

SPECIALIST - Specialist Routing

Attribute	Value
UI Name	Specialist Routing
Scientific Name	Route to domain expert
Code	`SPECIALIST`
Category	Model Routing Strategies
Description	Route to best model per content type/domain
Quality Improvement	Best domain performance
Latency	Medium
Cost	Medium
Min Models	2

Best For: `domain_specific`, `specialized_tasks`, `expert_needed` **Problem Indicators:** `specific_domain`, `expert_knowledge`, `specialized_task`

Domain-Specific Orchestration

DOMAIN_INJECT - Domain Expert Injection

Attribute	Value
UI Name	Domain Expert Injection
Scientific Name	Prepend domain prompts
Code	`DOMAIN_INJECT`
Category	Domain-Specific Orchestration
Description	Prepend domain-specific system prompts based on 800+ domain routing
Quality Improvement	Domain accuracy +20-40%
Latency	Low
Cost	Low
Min Models	1

Best For: `domain_tasks`, `specialized_knowledge`, `professional_contexts` **Problem Indicators:** `domain_specific`, `professional_context`, `specialized_knowledge`

MULTI_EXPERT - Multi-Expert Consensus

Attribute	Value
UI Name	Multi-Expert Consensus
Scientific Name	Multiple domain experts
Code	`MULTI_EXPERT`
Category	Domain-Specific Orchestration
Description	Route to multiple domain experts, synthesize
Quality Improvement	Expert consensus quality +30%
Latency	High
Cost	High
Min Models	3

Best For: `complex_domain`, `cross_functional`, `expert_consensus` **Problem Indicators:** `multi_domain`, `expert_critical`, `consensus_needed`

CHALLENGER_CONSENSUS - Challenger + Consensus

Attribute	Value
UI Name	Challenger + Consensus
Scientific Name	Baseline then challenge
Code	`CHALLENGER_CONSENSUS`

Attribute	Value
Category	Domain-Specific Orchestration
Description	Baseline round → Challenger round questioning assumptions → Synthesis
Quality Improvement	Removes blind spots +40%
Latency	High
Cost	High
Min Models	2

Best For: `assumption_testing`, `robust_analysis`, `critical_thinking` **Problem Indicators:** `assumptions_present`, `needs_challenge`, `robust_required`

CROSS_DOMAIN - Cross-Domain Synthesis

Attribute	Value
UI Name	Cross-Domain Synthesis
Scientific Name	Multi-domain merge
Code	`CROSS_DOMAIN`
Category	Domain-Specific Orchestration
Description	Detect multi-domain queries, route to each expert, merge insights
Quality Improvement	Cross-domain insight +50%
Latency	High
Cost	High
Min Models	3

Best For: `interdisciplinary`, `cross_functional`, `holistic_analysis` **Problem Indicators:** `multi_domain`, `interdisciplinary`, `holistic_needed`

Cognitive Frameworks

FIRST_PRINCIPLES - First Principles Thinking

Attribute	Value
UI Name	First Principles Thinking
Scientific Name	Decompose to fundamentals
Code	`FIRST_PRINCIPLES`
Category	Cognitive Frameworks
Description	Decompose problem to fundamental truths and rebuild solution

Attribute	Value
Quality Improvement	Novel solutions +60%
Latency	High
Cost	Medium
Min Models	1

Best For: `innovation`, `fundamental_analysis`, `breakthrough_thinking` **Problem Indicators:** `needs_innovation`, `fundamental_question`, `conventional_failed`

ANALOGICAL - Analogical Reasoning

Attribute	Value
UI Name	Analogical Reasoning
Scientific Name	Cross-domain patterns
Code	`ANALOGICAL`
Category	Cognitive Frameworks
Description	Find analogies from other domains to solve current problem
Quality Improvement	Creative solutions +40%
Latency	Medium
Cost	Medium
Min Models	1

Best For: `creative_solutions`, `cross_domain`, `pattern_matching` **Problem Indicators:** `stuck_on_problem`, `needs_creativity`, `pattern_available`

SYSTEMS - Systems Thinking

Attribute	Value
UI Name	Systems Thinking
Scientific Name	Feedback loops, emergence
Code	`SYSTEMS`
Category	Cognitive Frameworks
Description	Analyze as interconnected system with feedback loops and emergent properties
Quality Improvement	System understanding +50%
Latency	High
Cost	Medium
Min Models	1

Best For: `complex_systems`, `organizational`, `ecosystem_analysis` **Problem Indicators:** `complex_system`, `interconnected`, `feedback_present`

SOCRATIC - Socratic Method

Attribute	Value
UI Name	Socratic Method
Scientific Name	Dialectical questioning
Code	`SOCRATIC`
Category	Cognitive Frameworks
Description	Use probing questions to stimulate critical thinking and illuminate ideas
Quality Improvement	Understanding depth +40%
Latency	Medium
Cost	Medium
Min Models	1

Best For: `learning`, `clarification`, `deep_understanding` **Problem Indicators:** `needs_clarity`, `learning_context`, `deep_dive`

TRIZ - TRIZ

Attribute	Value
UI Name	TRIZ
Scientific Name	Contradiction resolution
Code	`TRIZ`
Category	Cognitive Frameworks
Description	Use contradiction matrices and 40 inventive principles
Quality Improvement	Inventive solutions +70%
Latency	High
Cost	Medium
Min Models	1

Best For: `engineering`, `invention`, `contradiction_resolution` **Problem Indicators:** `contradiction_present`, `engineering_problem`, `invention_needed`

DESIGN_THINKING - Design Thinking

Attribute	Value
UI Name	Design Thinking
Scientific Name	Empathize→Define→Ideate→Prototype→Test
Code	`DESIGN_THINKING`
Category	Cognitive Frameworks
Description	Human-centered design process with iteration
Quality Improvement	User satisfaction +50%
Latency	Very High
Cost	High
Min Models	1

Best For: `product_design`, `user_experience`, `innovation` **Problem Indicators:** `user_focused`, `design_problem`, `needs_iteration`

SCIENTIFIC - Scientific Method

Attribute	Value
UI Name	Scientific Method
Scientific Name	Hypothesis→Experiment→Analysis
Code	`SCIENTIFIC`
Category	Cognitive Frameworks
Description	Formulate hypothesis, design experiment, analyze results
Quality Improvement	Rigorous conclusions +60%
Latency	High
Cost	Medium
Min Models	1

Best For: `research`, `investigation`, `empirical_questions` **Problem Indicators:** `testable_question`, `research_needed`, `empirical`

LATERAL - Lateral Thinking

Attribute	Value
UI Name	Lateral Thinking
Scientific Name	Random entry, provocation
Code	`LATERAL`
Category	Cognitive Frameworks
Description	Use random stimuli and provocations to break conventional thinking
Quality Improvement	Creative breakthroughs +80%

Attribute	Value
Latency	Medium
Cost	Low
Min Models	1

Best For: `creativity`, `brainstorming`, `unconventional_solutions` **Problem Indicators:** `stuck_in_rut`, `needs_creativity`, `brainstorming`

ABDUCTIVE - Abductive Reasoning

Attribute	Value
UI Name	Abductive Reasoning
Scientific Name	Inference to best explanation
Code	`ABDUCTIVE`
Category	Cognitive Frameworks
Description	Generate and evaluate hypotheses to find best explanation
Quality Improvement	Explanation quality +40%
Latency	Medium
Cost	Medium
Min Models	1

Best For: `diagnosis`, `investigation`, `hypothesis_generation` **Problem Indicators:** `unexplained_phenomenon`, `diagnosis_needed`, `mystery`

COUNTERFACTUAL - Counterfactual Thinking

Attribute	Value
UI Name	Counterfactual Thinking
Scientific Name	What-if analysis
Code	`COUNTERFACTUAL`
Category	Cognitive Frameworks
Description	Explore alternative scenarios and their implications
Quality Improvement	Risk identification +50%
Latency	High
Cost	Medium
Min Models	1

Best For: `planning`, `risk_analysis`, `scenario_planning` **Problem Indicators:** `scenario_analysis`, `risk_assessment`, `planning`

DIALECTICAL - Dialectical Thinking

Attribute	Value
UI Name	Dialectical Thinking
Scientific Name	Thesis-antithesis-synthesis
Code	`DIALECTICAL`
Category	Cognitive Frameworks
Description	Explore opposing views to reach higher synthesis
Quality Improvement	Balanced conclusions +45%
Latency	High
Cost	Medium
Min Models	1

Best For: `philosophy`, `conflict_resolution`, `synthesis` **Problem Indicators:** `opposing_views`, `conflict_present`, `synthesis_needed`

MORPHOLOGICAL - Morphological Analysis

Attribute	Value
UI Name	Morphological Analysis
Scientific Name	Parameter space exploration
Code	`MORPHOLOGICAL`
Category	Cognitive Frameworks
Description	Systematically explore all possible parameter combinations
Quality Improvement	Option coverage +70%
Latency	High
Cost	Medium
Min Models	1

Best For: `systematic_exploration`, `option_generation`, `completeness` **Problem Indicators:** `many_parameters`, `systematic_needed`, `completeness_required`

PREMORTEM - Pre-mortem Analysis

Attribute	Value
UI Name	Pre-mortem Analysis
Scientific Name	Prospective hindsight
Code	`PREMORTEM`

Attribute	Value
Category	Cognitive Frameworks
Description	Imagine failure has occurred and work backwards to identify causes
Quality Improvement	Risk mitigation +60%
Latency	Medium
Cost	Low
Min Models	1

Best For: `risk_management`, `project_planning`, `failure_prevention` **Problem Indicators:** `project_start`, `risk_critical`, `planning_phase`

FERMI - Fermi Estimation

Attribute	Value
UI Name	Fermi Estimation
Scientific Name	Order of magnitude reasoning
Code	`FERMI`
Category	Cognitive Frameworks
Description	Break down estimation into smaller, estimable components
Quality Improvement	Estimation accuracy +50%
Latency	Low
Cost	Low
Min Models	1

Best For: `estimation`, `quick_analysis`, `order_of_magnitude` **Problem Indicators:** `unknown_quantity`, `estimation_needed`, `limited_data`

Quick Reference Tables

Workflows by Category

Category	Count	Workflows
Adversarial & Validation	2	ARE, LM_VS_LM
Debate & Deliberation	3	SOD, MDA, ReConcile
Judge & Critic	3	LAAJE, RLAIF, IREF
Ensemble & Aggregation	3	SCMR, CWMA, SMoE
Reflection & Self-Improvement	3	ISFR, VRL, LATS
Verification & Fact-Checking	2	CoVe, SelfRAG
Multi-Agent Collaboration	2	LLM_MAS, MAPR

Category	Count	Workflows
Reasoning Enhancement	9	CoT, ZeroShotCoT, ToT, GoT, ReAct, L2M, PS, MCP, PoT
Model Routing Strategies	4	SINGLE, ENSEMBLE, CASCADE, SPECIALIST
Domain-Specific Orchestration	4	DOMAIN_INJECT, MULTI_EXPERT, CHALLENGER_CONSENSUS, CROSS_DOMAIN
Cognitive Frameworks	14	FIRST_PRINCIPLES, ANALOGICAL, SYSTEMS, SOCRATIC, TRIZ, DESIGN_THINKING, SCIENTIFIC, LATERAL, ABDUCTIVE, COUNTERFACTUAL, DIALECTICAL, MORPHOLOGICAL, PREMORTEM, FERMI

Workflows by Cost/Latency

Cost	Low Latency	Medium Latency	High Latency	Very High Latency
Low	ZeroShotCoT, SINGLE, FERMI, LATERAL	PoT, SMoE	-	-
Medium	-	CoT, PS, SCMR, CWMA, SOCRATIC, ABDUCTIVE, ANALOGICAL	CoVe, SelfRAG, ReAct, L2M, VRL, MCP, ISFR, RLAIF, FIRST_PRINCIPLES, SYSTEMS, SCIENTIFIC, COUNTERFACTUAL, DIALECTICAL, MORPHOLOGICAL, PREMORTEM, TRIZ	-

Cost	Low Latency	Medium Latency	High Latency	Very High Latency
High	-	LAAJE, SPECIALIST	ARE, LM_VS_LM, IREF, MAPR, MULTI_EXPERT, CHALLENGER_CONSENSUS, CROSS_DOMAIN, LLM_MAS	DESIGN_THINKING
Very High	-	-	-	SOD, MDA, ReConcile, LATS, ToT, GoT

Workflows by Minimum Models Required

Min Models	Workflows
1	CoT, ZeroShotCoT, ToT, GoT, ReAct, L2M, PS, MCP, PoT, SINGLE, ISFR, VRL, LATS, CoVe, SelfRAG, DOMAIN_INJECT, FIRST_PRINCIPLES, ANALOGICAL, SYSTEMS, SOCRATIC, TRIZ, DESIGN_THINKING, SCIENTIFIC, LATERAL, ABDUCTIVE, COUNTERFACTUAL, DIALECTICAL, MORPHOLOGICAL, PREMORTEM, FERMI
2	ARE, LM_VS_LM, LAAJE, RLAIF, IREF, SMoE, CASCADE, SPECIALIST, CHALLENGER_CONSENSUS
3	SOD, MDA, ReConcile, SCMR, CWMA, LLM_MAS, MAPR, ENSEMBLE, MULTI_EXPERT, CROSS_DOMAIN

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