Agentic Design Patterns Part 1

Four AI Agent Strategies That Improve GPT-4 and GPT-3.5 Performance

Based on insights from Andrew Ng, DeepLearning.AI

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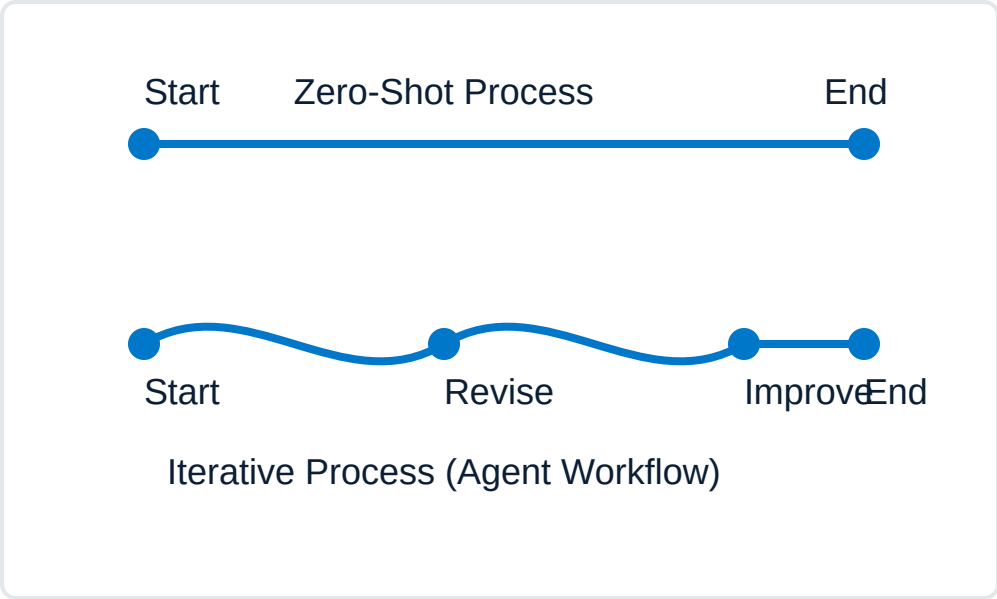
The Zero-Shot Limitation

- Current LLM usage: Zero-shot mode (one-pass generation)
- Like writing an essay straight through without backspacing
- Despite difficulty, LLMs perform amazingly well
- But there's significant room for improvement



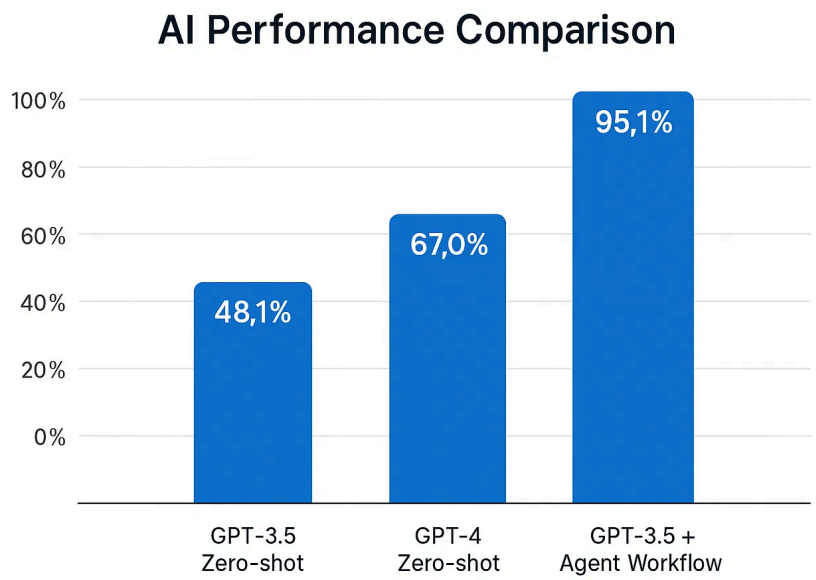
Agent Workflows: The Game Changer

- **Iterative approach** vs single-pass generation
- Enables LLMs to **revise and improve** their work multiple times
- Mirrors how **humans naturally work** - planning, drafting, reviewing, revising
- Creates a **feedback loop** that dramatically improves quality

The Numbers Don't Lie

- HumanEval coding benchmark results show **dramatic improvements**
- GPT-3.5 (zero shot): **48.1%** correct
- GPT-4 (zero shot): **67.0%** correct
- GPT-3.5 with agent workflow: **95.1%** correct

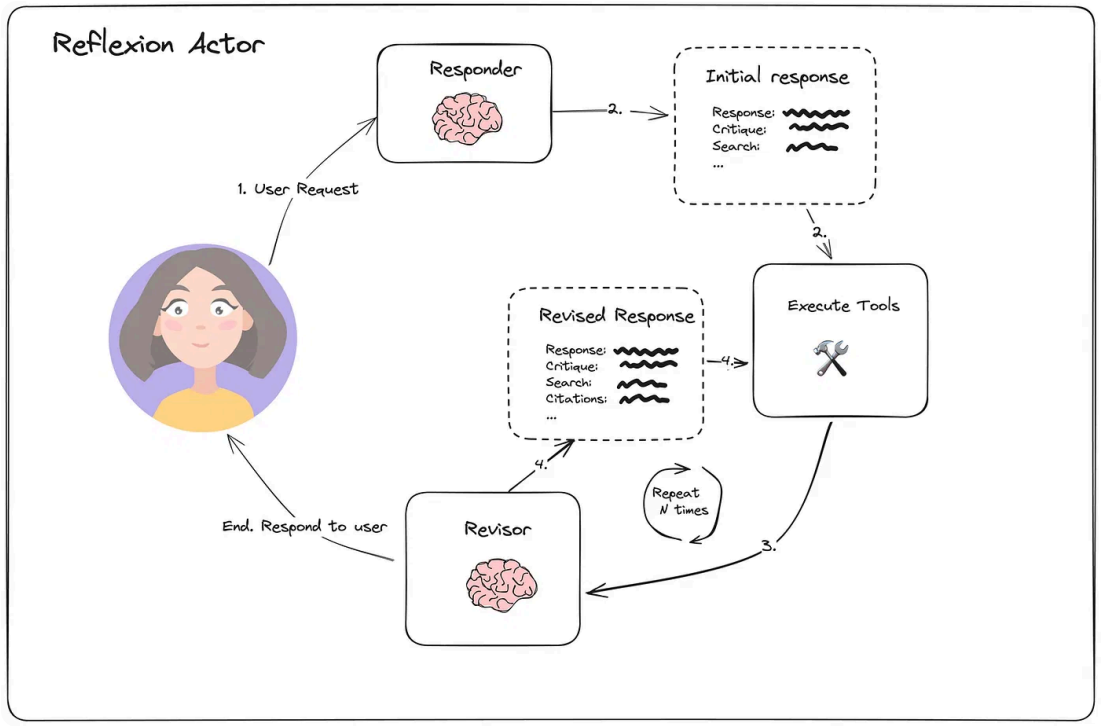
Key Insight: Agent workflows provide more improvement than upgrading from GPT-3.5 to GPT-4



Design Pattern 1: Reflection

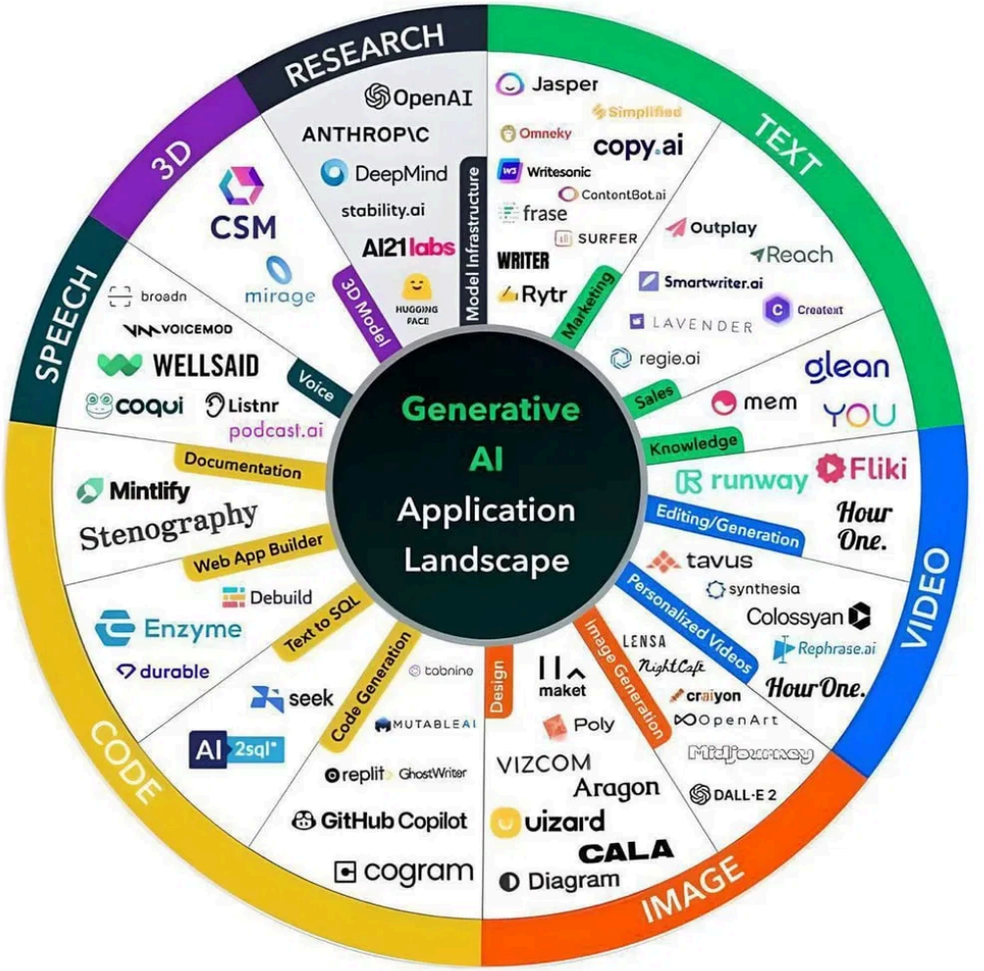
> **Definition:** The LLM examines its own work to come up with ways to improve it.

- Enables **self-evaluation** and self-improvement capability
- Identifies **logical inconsistencies**, factual errors, and stylistic issues
- Creates a **feedback loop** between output generation and critique



Design Pattern 2: Tool Use

- LLM is given **external tools and functions** to extend capabilities
- Examples: web search | code execution | data processing
- Enables **information gathering**, **action taking**, and **data manipulation**
- Transforms LLMs from **passive text generators** to **active problem solvers**



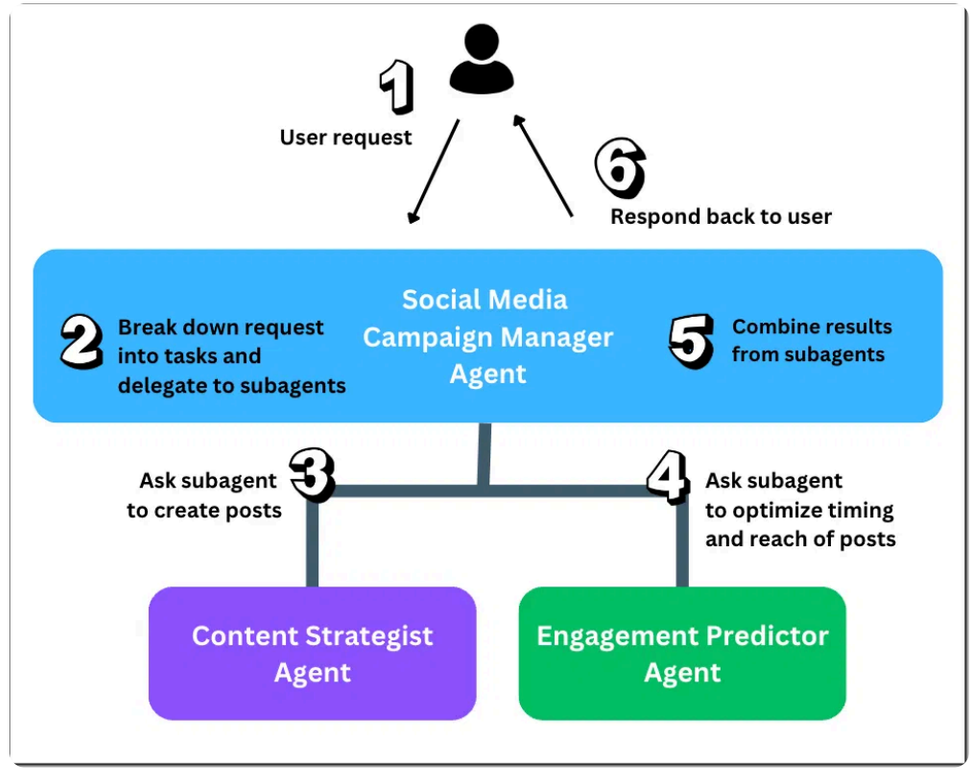
Design Patterns 3 & 4: Planning and Multi-Agent

3. Planning

- LLM creates and executes multistep plans to achieve goals
- Strategic thinking and structured execution

4. Multi-Agent Collaboration

- Multiple AI agents work together on complex tasks
- Splitting tasks, discussing ideas, and debating solutions
- Produces better results than single agents working alone



The Future is Agentic

- Agent workflows will drive **massive AI progress** — perhaps even more than next-gen foundation models
- The four patterns provide a **framework for building better AI systems**: Reflection, Tool Use, Planning, Multi-Agent
- Open source agent tools and academic research are **proliferating rapidly**

Start experimenting with agent workflows today!