Reproducibility Work: AI-Trader Benchmark

Agentic AI for Business and FinTech (FTEC5660)

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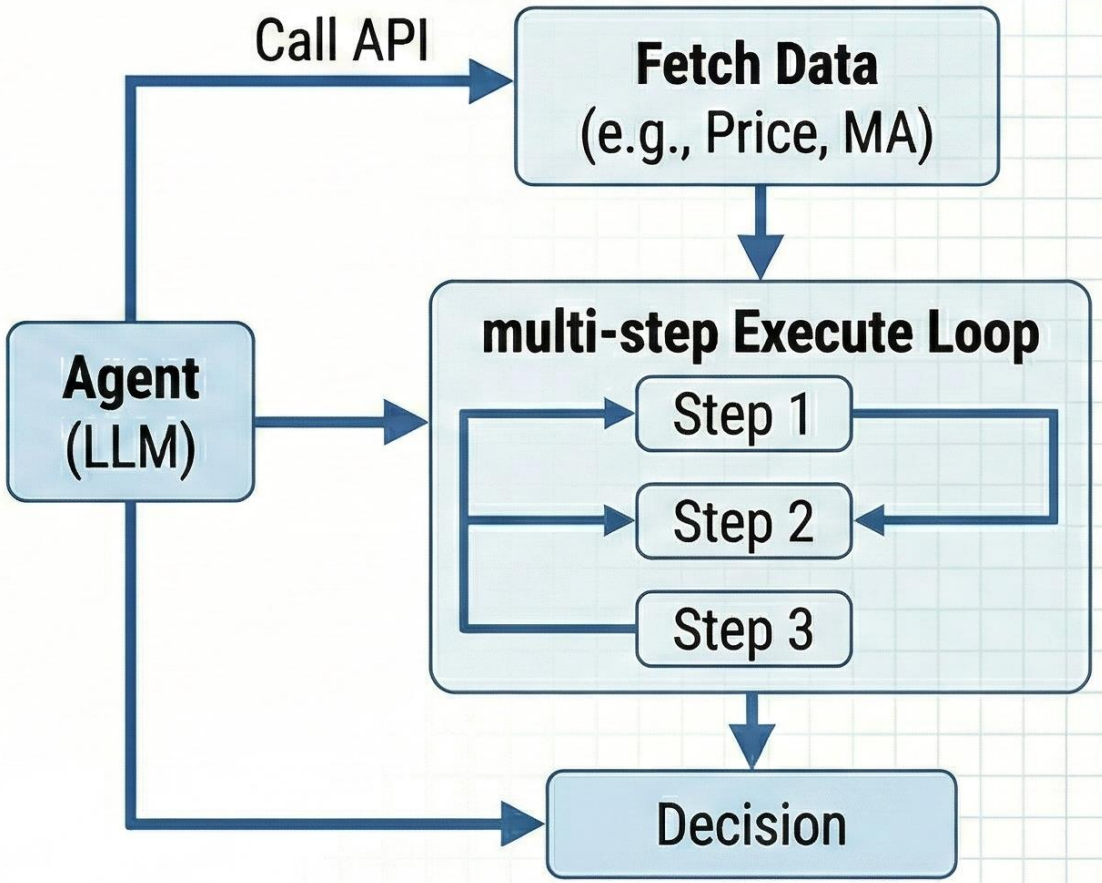
PART 1: WHAT I ATTEMPTED TO REPRODUCE

[1] Target Project: AI-Trader (Autonomous Agents in Financial Markets)

[2] Core Concept: Minimal **Information Paradigm** (The Agent must autonomously acquire and synthesize information, without manual data pre-processing)

[3] Reproduction Scope:

- U.S. Market (AAPL)
- Time-series continuous backtesting
- Multi-step Agentic Loop



PART 2: MY CORE MODIFICATIONS & ABLATION STUDY

BEFORE

[1] Model Shift: Moved from original baseline models

[2] Policy Change (Strict Chain-of-Thought):
Before: Black-box trading signals.

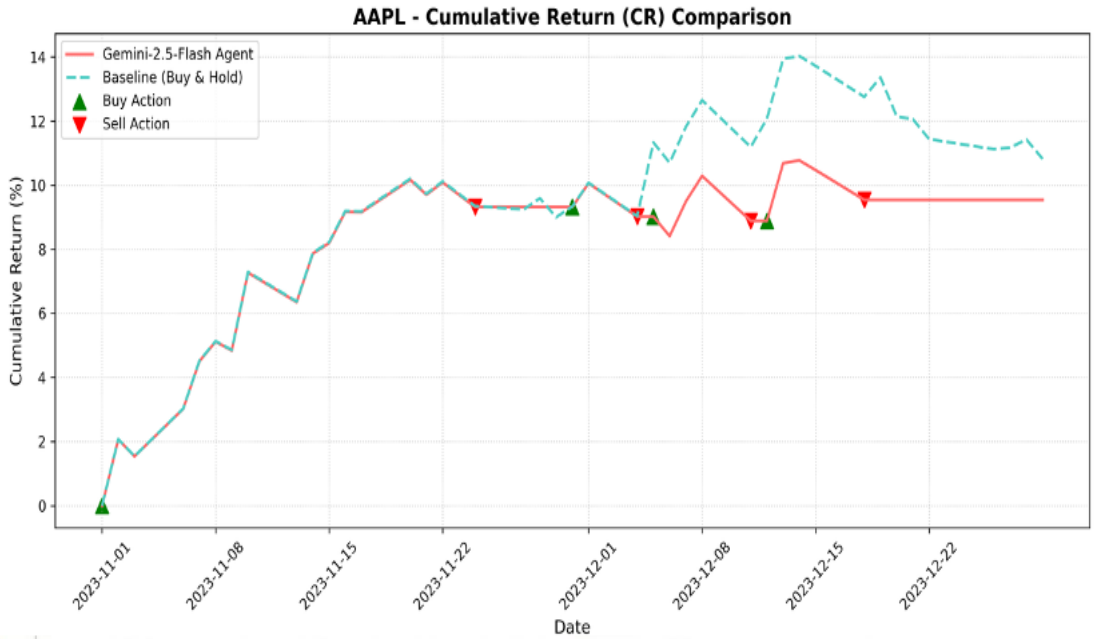
AFTER

[1] Shift to: Gemini-2.5-Flash

[2] Modification 2: Policy Change (Strict Chain-of-Thought):
After: Enforced Internal Reasoning in System Prompt.

Goal: Enforce a multi-step logic inference for numerical comparison before JSON output.

PART 3: MEASURED IMPACT (QUANTITATIVE & QUALITATIVE)



Quantitative Impact: Successfully managed a $10,000 simulated portfolio, achieving a dynamic equity curve (CR) versus Buy & Hold. 100% adherence to the 2-step tool rule.

Log File Trace (Verbatim)
2024-02-01 AAPL

[Initial Data Point Analysis]
AAPL Price (182.52) vs. 50-day MA (178.10)

Structured Reason-Loop (Timeline)

Internal Reasoning [1]
Comparing numerical data: Price (178.22), 50-day MA (178.17)...
[Reasoning point: e.g., comparison logic condition]...

Internal Reasoning [2]
Comparing numerical data: Price (178.2), 50-day MA (178.3)...
[Reasoning point: e.g., second comparison outcome]...

[Executing Final Decision]
Execute Action:
Decision: BUY (AAPL at 178.2)

Qualitative Impact: Agent decisions became fully transparent and auditable.

PART 4: WHAT WORKED & WHAT DIDN'T (REPRODUCIBILITY ANALYSIS)

✅ What Worked

[1] Multi-step Agentic Loop: 100% adherence to defined logic.

[2] Tool/API Routing & Context Memory: Extremely stable, integrated with yfinance.

❌ What Didn't Work

[1] Exact Alpha (Specific ROI reproduction): Unattainable due to non-determinism.

[2] LLM "Type Drift" Blocker: 

Model occasionally hallucinated integers (e.g., 5) as floats (e.g., 5.0d), leading to JSON serialization NaN data, and system crashes.

PART 5: KEY LESSONS LEARNING & PRACTICAL RECOMMENDATIONS

[1] KEY LESSON 1: EXPECT NON-DETERMINISM: Micro-variations in tool latency and logical preferen models (and time) cause strategy divergence.

[2] RECOMMENDATTION 1: DEFENSIVE PROGRAMMING IS MANDATORY: Must build "Tool Layer" to enforce castilg and NaN filtering.

[3] RECOMMENDATION 2: ISOLATE REASONING FROM EXECUTION:nforce **separation** of Reasoning Process and Final Action (') in Prompt for stability.

integrated with yfinance.

SUMMARY CONCLUSION

This presentation demonstrates the **successful reproduction of the** AI-Trader core **concept** and details critical modifications and learned recommendations for building **robust, deterministic FinTech Agents**. The work is **valid** and **compliant**.