CrewAI Multi-Agent Investment Analysis Lab Report

Overview

In this lab, I developed a multi-agent investment analysis system to investigate advanced CrewAI features. Understanding how agent delegation operates and determining whether specialised agents could generate more insightful investment recommendations than a single generalist approach were my main goals.

What I Changed

Enhanced the Trading Strategist

As part of the hands-on exercise, I redesigned the Trading Strategist as a "Quantitative Trading Strategist." My approach was to make this agent focus specifically on data-driven decisions and risk metrics. I gave it access to the Yahoo Finance scraper and wrote a detailed backstory about algorithmic trading experience, which resulted in more precise outputs with specific price targets.

Built Custom Financial Tools

Following the lab requirements, I created three calculation tools:

- A risk/reward calculator to compute precise trade risk metrics
- A technical analysis tool that pulls real price data and calculates SMA (20/50) and RSI
- A fundamental metrics extractor for P/E ratios, profit margins, and growth rates

I integrated these directly into the strategy task description, which was crucial for getting specific price targets instead of general recommendations.

Modified the Analysis Workflow

I enhanced the analysis function to feed actual technical and fundamental data from my tools directly to the strategist. This integration of real-time data with AI analysis had a significant impact on output quality.

Testing Results

I analyzed three tech stocks with the following outcomes:

TSLA - SELL at $322.05

- Targets: $300, $280, $250 (bearish progression)
- Risk/Reward: 3:1 with stop at $340
- The system identified bearish trend with low RSI and fundamental overvaluation

GOOGL - BUY at $173.32

- Targets: $180, $185, $190 (bullish progression)
- Risk/Reward: 2.5:1 with stop at $168
- Picked up on digital advertising recovery and strong revenue growth

NVDA - BUY at $145.48

- Targets: $160, $180, $200 (most aggressive)
- Risk/Reward: 4:1 with stop at $140
- Benefiting from the AI boom, backed by strong financial performance

All three received 5% position sizing, showing consistent risk management across different volatility profiles.

Observations

The enhanced Trading Strategist made a significant difference in output quality. The original AAPL analysis provided basic BUY/SELL recommendations with simple targets. After enhancement, the system produced

complete trading strategies including entry zones, three-tiered targets, specific stop-loss percentages, and risk/reward ratios. For example, TSLA's analysis included a detailed entry zone ($320-325) and progressive targets down to $250, compared to the original single-point recommendations.

Real market data was brought into the mix using custom tools, which made the recommendations feel grounded and data-driven. For example, the system linked TSLA's downward trend and low RSI to a clear sell signal, while the bullish signs for GOOGL and NVDA backed up the decision to buy. The delegation feature also worked smoothly—each specialist stayed focused on their area of expertise, which led to a well-rounded analysis without any overlap.

Learnings

Working with a multi-agent system taught me that it's not just about dividing tasks, it's about creating collective intelligence. The Portfolio Manager didn't just combine the specialists' inputs; it blended them together into a deeper, more insightful analysis than any single agent could've produced on its own.

I also realized how much the way we describe agents shapes their output. When I gave the trading strategist a stronger backstory, the whole approach to analysis shifted, not just how the insights were presented, but what was being analyzed and why.

One thing that really stood out was the contrast in recommendations: a SELL for TSLA, but BUY signals for the others. That showed me the system wasn't just applying a template, it was treating each company uniquely. That kind of individualized analysis gave me a lot more confidence in the method.

Ideas for Improvement

- Sentiment Scoring: Turn news insights into numerical sentiment scores for more actionable insights
- Smarter Delegation: Let the Portfolio Manager adjust which specialists to consult based on market shifts

Alternative Approaches

- Adversarial Setup: Use opposing bull and bear agents, with the Portfolio Manager deciding between them
- Time-Based Roles: Assign different agents for short-term trading versus long-term investing

Conclusion

This lab showed that specialized AI agents with delegation can mirror how real investment teams work. The most valuable insight was that sophisticated AI systems still depend heavily on quality data and clear role definitions. My custom tools and improved descriptions had more impact than expected, proving that architecture matters as much as the underlying models.