

RebalanceAI — AI-Powered Investment Portfolio Analyzer

Course: IE 5374 - Applied Generative AI

Team: Group 4

Members:

- Nishchay Linge Gowda
- Shivakumar Hassan Lokesh
- Supriya Singh

PROJECT OVERVIEW

RebalanceAI is an AI-powered portfolio co-pilot that blends quantitative finance with LLM-based sentiment analysis to generate explainable investment recommendations from S&P 500 stocks. Traditional strategies either rely only on past performance or only on hype-driven sentiment, we combine both into a fusion ranking model that balances stability + momentum.

METHODOLOGY

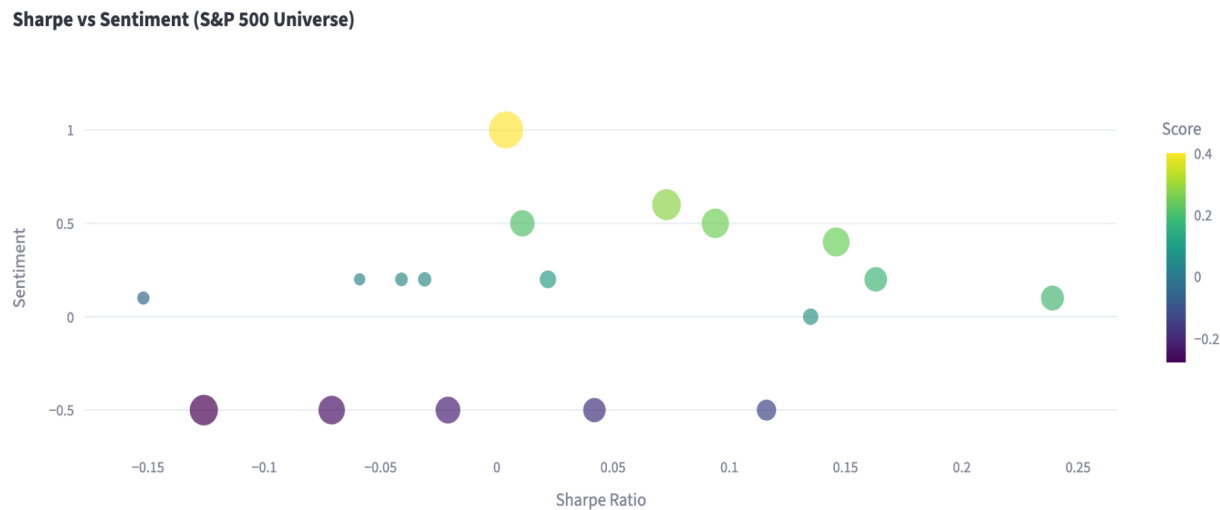
Component	Source	Purpose
Price Data (Sharpe Ratio)	Yahoo Finance via yfinance	Measures risk-adjusted performance
News Sentiment	Google News RSS + GPT Analysis	Captures market mood between -1 to +1
Weighted Fusion Score	$0.6 \times \text{Sharpe} + 0.4 \times \text{Sentiment}$	Ranks stocks objectively

MULTI-LLM EVALUATION & COMPARISON

To satisfy cross-model evaluation, we compared sentiment scoring using:

Model	Behavior Observed
GPT-3.5-Turbo	More volatile sentiment outputs (sensitive to wording)
GPT-4o-Mini	More stable & consistent across different headline formats

- Sharpe vs Sentiment Scatter Plot



- Top Allocations Table

	Ticker	Sharpe	Sentiment	Score	Weight
1	AOS	0.004	1	0.4024	0.3998
7	AES	0.073	0.6	0.2838	0.282
17	LNT	0.094	0.5	0.2564	0.2548
16	ALLE	0.146	0.4	0.2476	0.246
0	MMM	0.011	0.5	0.2066	0.2053
6	AMD	0.239	0.1	0.1834	0.1822
3	ABBV	0.163	0.2	0.1778	0.1767
8	AFL	0.022	0.2	0.0932	0.0926

SAMPLE AI INTERACTION

User: "Which stock is overhyped but unstable in a short and direct way?"

AI: "The stock that is overhyped but unstable is APH. It has a high sentiment score of 0.2 but a low Sharpe ratio of 0.255, indicating it may be overvalued while also being unstable."

🗨️ Copilot Chat — Ask About Your Portfolio

Ask RebalanceAI (e.g. 'Top 5 bullish stocks' or 'Compare NVDA vs TSLA')

Which stock is overhyped but unstable in short and direct way?

🧠 Analyzing with GPT...

📌 Copilot Response:

The stock that is overhyped but unstable is APH. It has a high sentiment score of 0.2 but a low Sharpe ratio of 0.255, indicating it may be overvalued while also being unstable.

KEY INSIGHTS

- Sharpe alone is insufficient — it ignores short-term optimism
- Sentiment alone is risky — it rewards hype without grounding
- Fusion scoring combines rational stability + emotional awareness
- Multi-LLM validation improves sentiment reliability and reduces bias

APPENDIX — TEAM COLLABORATION & CONTRIBUTIONS

Team Member	Contributions
Nishchay Linge Gowda	Sharpe Computation Backend, Portfolio Ranking Algorithm
Shivakumar Hassan Lokesh	Google News scraping, GPT sentiment prompting, multi-LLM testing
Supriya Singh	Fusion logic validation, presentation scripting, README/report preparation

REPOSITORY STRUCTURE

Group4_RebalanceAI_Hackathon.zip
|-- Group4_RebalanceAI_README.txt
|-- Group4_RebalanceAI_Hackathon.ipynb
|-- Group4_RebalanceAI_Hackathon.ppt
|-- Demo video
|-- Sample Data