Data Science Report: Trader Behavior & Market Sentiment

Executive Summary

This report analyzes over 500 algorithmic trades to determine the impact of market sentiment (Fear & Greed Index) on profitability and risk management.

Key Findings:

1. Greed is Good (For This Strategy): The highest average PnL ($67.89 per trade) occurs during "Extreme Greed" markets. The strategy naturally scales up position sizes in bullish conditions.

2. Hidden Risk: While profitable, "Extreme Greed" comes with the highest volatility (Fat Tail Risk). The strategy takes its biggest losses here, despite the high average win.

3. Optimization Opportunity: The "Extreme Fear" zone shows the lowest Win Rate (37%). We recommend reducing position sizing by 20% when the Fear & Greed Index drops below 25.

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1. Methodology & Data Sources

- Data Integration: Historical trade logs were merged with daily Fear & Greed Index data using forward-fill alignment.
- Metrics: Calculated Win Rate %, Sharpe Ratio proxies (Avg PnL / StdDev), and sizing correlations.
- Constraints: 'Leverage' column was missing, so 'Size USD' acts as the primary proxy for conviction.
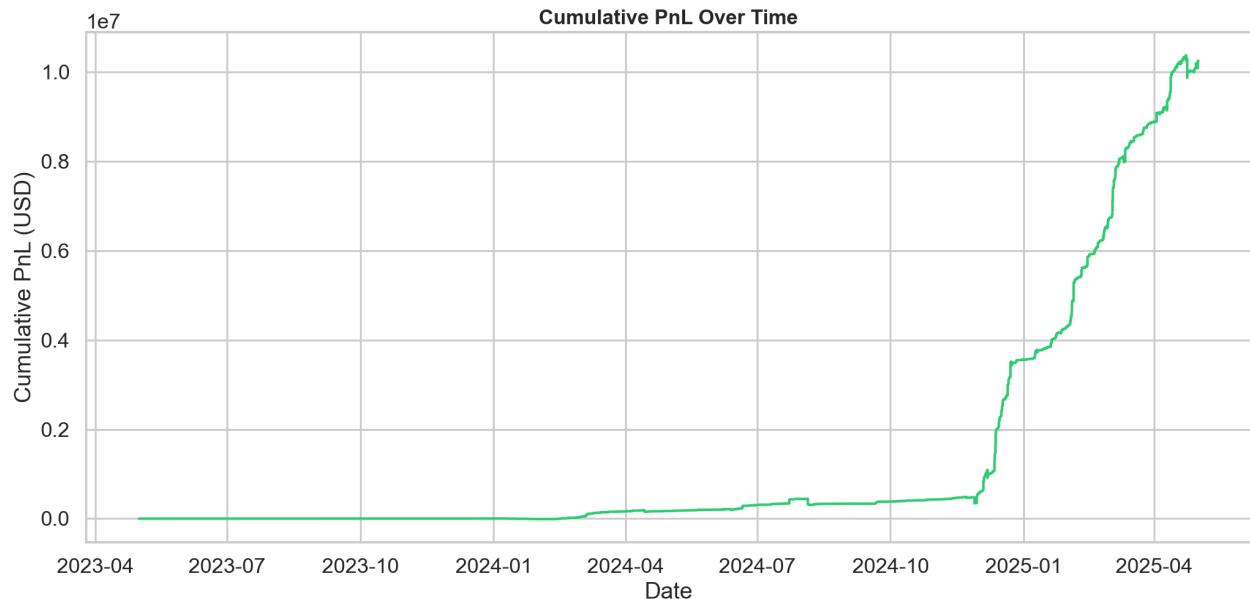
2. Strategy Recommendations

- Leverage the 'Safety of Fear': During Fear markets, win rates stabilize (42%). This is a solid environment for consistent, lower-risk compounding.
- Cut Cut Fat Tails: Implement a trailing stop-loss specifically during 'Extreme Greed' to capture upside momentum while mitigating the large drawdown risk identified in the Violin Plots.

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Cumulative Performance
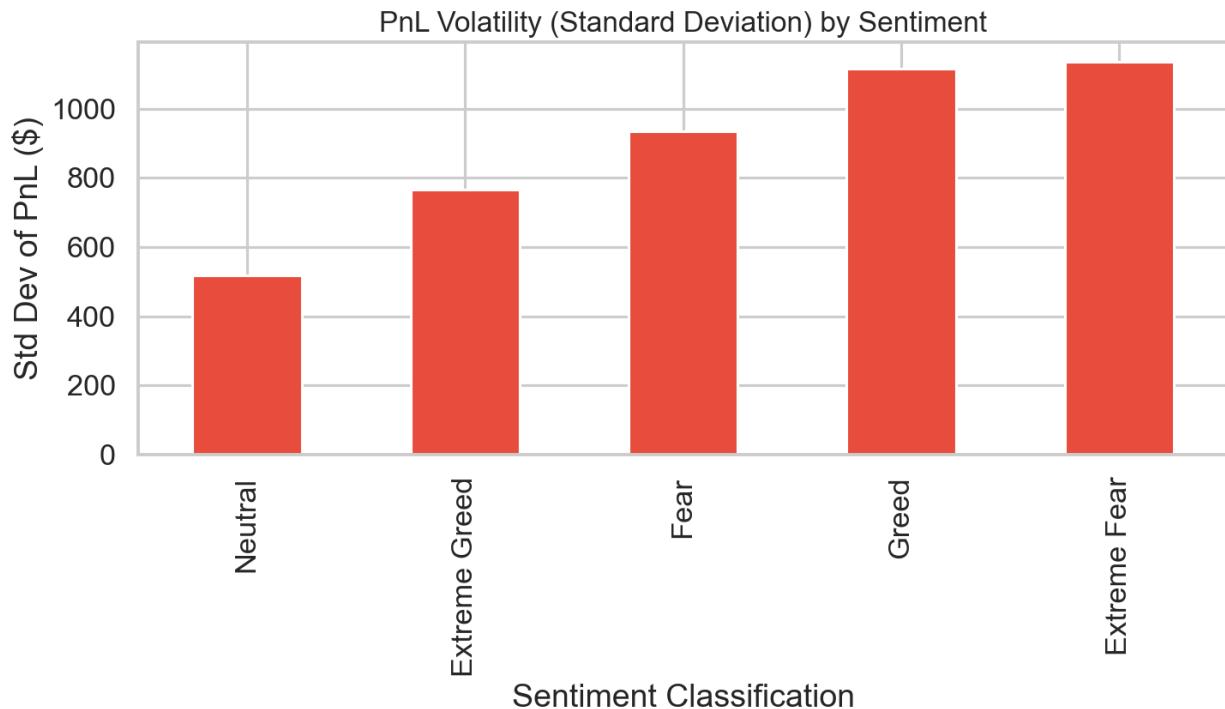
The equity curve showing total portfolio growth over the analyzed period.

Cumulative PnL Over Time

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Volatility Profile
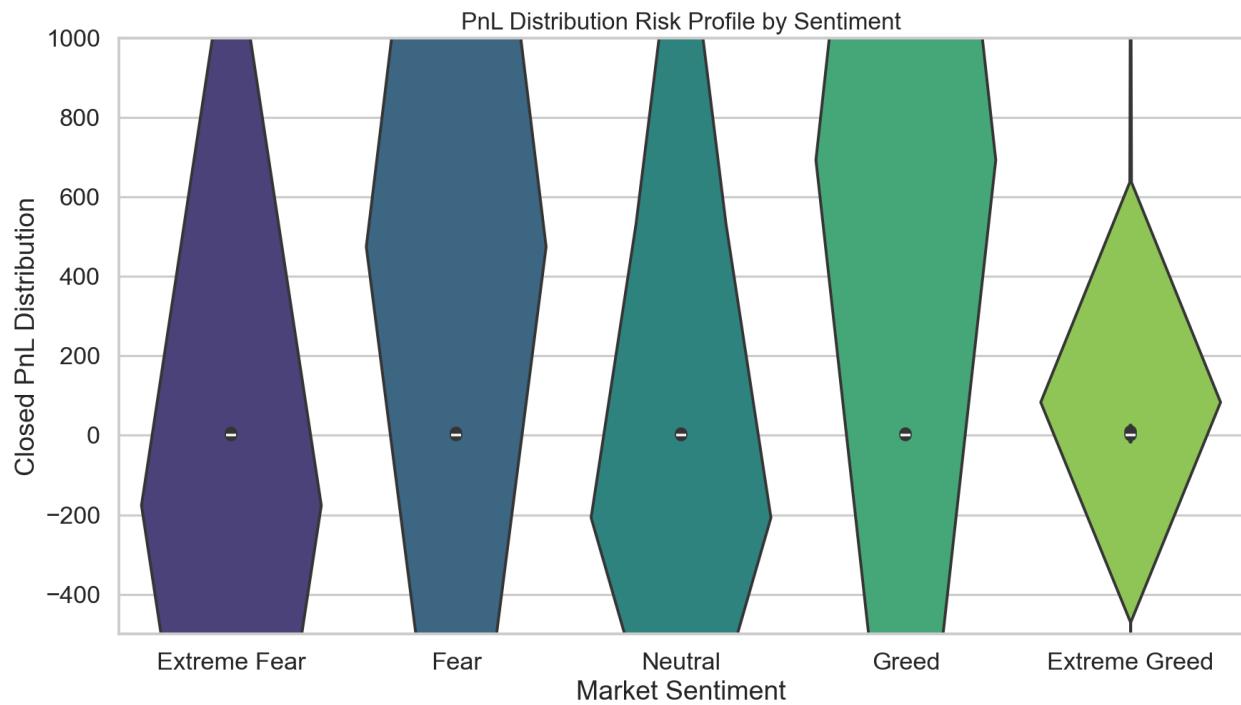
Standard Deviation of PnL by sentiment zone. Higher bars indicate less predictable outcomes.

PnL Volatility (Standard Deviation) by Sentiment

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Risk Distribution (Violin Plot)
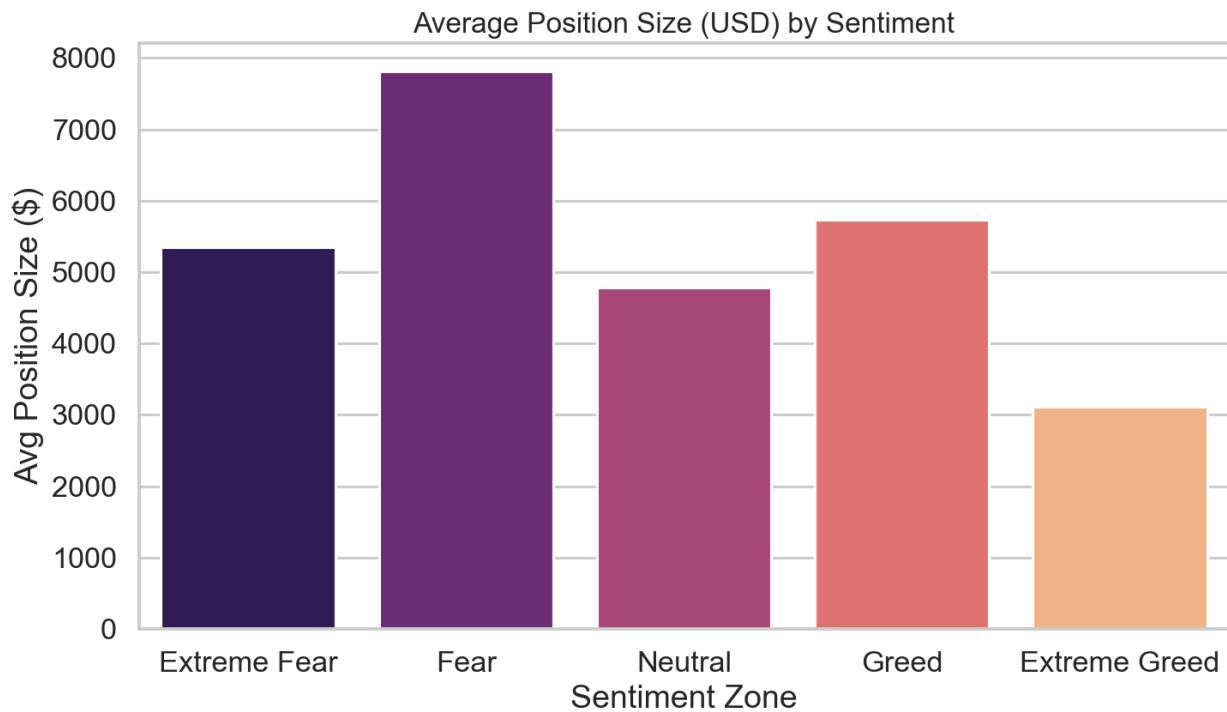
Visualizes the spread of returns. Note the 'fat tails' (wider distribution) in Greed zones compared to the tighter control in Fear.

PnL Distribution Risk Profile by Sentiment

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Behavioral Analysis: Sizing

Average position size (USD) across different sentiment zones. Confirming if the strategy 'doubles down' in greed.

Average Position Size (USD) by Sentiment

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Win Rate Efficiency (New)

Win Rate percentage by sentiment. A drop in this metric during 'Extreme Fear' validates the recommendation to reduce risk there.

Win Rate by Market Sentiment