DS_report

Exploring the Relationship Between Trader Performance and Market Sentiment

Results

1. Profitability by Sentiment

The results show that sentiment plays a significant role in shaping overall profitability. On average, traders performed best under Fear conditions, generating the highest mean closed PnL (154.2) and the most favorable risk-adjusted returns (highest Sortino ratio). Extreme Greed markets also delivered positive returns (mean PnL = 46.6), but the higher volatility in losses reduced the efficiency of these gains. Neutral markets provided moderate and stable outcomes, while Greed markets consistently underperformed, with very low profitability and near-zero Sharpe and Sortino ratios.

This suggests that traders are more disciplined and effective under Fear, while Greed encourages overconfidence and poor decision-making. Extreme Greed, although profitable in nominal terms, exposes traders to large downside risks.

Table 1. Mean Closed PnL by Sentiment

Classification	Mean Closed PnL
Extreme Greed	46.62
Fear	154.25
Greed	13.23
Neutral	76.45

Figure 1. Average PnL by Sentiment (bar chart)

Average Closed PnL per Sentiment Classification
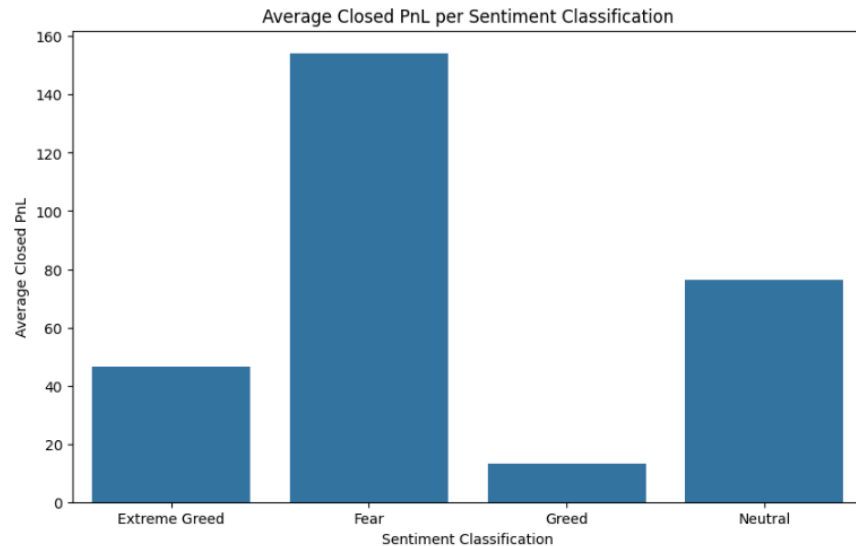
2. Win Rate by Sentiment

Table 2. Win Rate by Sentiment

Classification	Win Rate
Extreme Greed	70.7%
Fear	48.1%
Greed	38.0%
Neutral	42.9%

Although win rates were highest in Extreme Greed, average PnL was far higher in Fear, suggesting larger and more effective trades despite fewer wins.

3. Trade Sizing and Fees :

Win rates varied across sentiments, with the highest observed in Extreme Greed (71%) and the lowest in Greed (38%). However, trade sizing revealed an important nuance. In Fear markets, traders committed the largest average trade sizes ($15.5K) and still managed to remain profitable, highlighting a confident but disciplined approach. In Extreme Greed, traders typically used smaller trade sizes ($4.1K), which helped manage risk despite higher win rates. By contrast, Greed conditions were marked by large trade sizes but poor outcomes, reflecting inefficient capital allocation.

Table 3. Average Trade Size (USD) by Sentiment

Classification	Avg Trade Size (USD)
Extreme Greed	4,101
Fear	15,499
Greed	10,965
Neutral	8,809

Fear trades were the largest on average, while Extreme Greed trades were much smaller.

Table 4. Average Fees by Sentiment

Classification	Avg Fee
Extreme Greed	0.58
Fear	3.05
Greed	3.04
Neutral	3.01

4. PnL by Side and Direction :

Analysis by trade side and direction showed that Buy trades during Fear markets produced the strongest returns, particularly when closing short positions. In Neutral markets, Sell trades were also profitable. Conversely, Buy trades in Greed markets were consistently loss-making. Closing positions (both Long and Short) emerged as the most important contributors to profitability, while less common directions such as Auto-Deleveraging or Spot Conversions had minimal impact.

Table 5. Average Closed PnL by Sentiment and Side

Classification	Buy PnL	Sell PnL
Extreme Greed	50.2	43.3
Fear	225.9	82.2
Greed	-115.9	136.7
Neutral	29.0	116.1

Fear-driven Buy trades were most profitable, while Greed-driven Buy trades were strongly negative.

Figure 4. Heatmap of PnL by Sentiment and Side


6. Risk-Adjusted Returns

Cumulative PnL analysis confirmed that Fear-driven trading compounded steadily over time, while Greed-driven trading stagnated. Sharpe and Sortino ratio analysis reinforced this pattern: Fear provided the best balance of returns and risk, Extreme Greed looked attractive on the Sharpe ratio but much weaker on the Sortino due to high downside volatility, and Greed produced negligible efficiency.

Table 6. Sharpe and Sortino Ratios by Sentiment

Classification	Sharpe	Sortino
Extreme Greed	0.12	0.026
Fear	0.08	0.092
Greed	0.006	0.002

Classification	Sharpe	Sortino
Neutral	0.06	0.016

Fear provided the best risk-adjusted performance once downside risk was considered, while Extreme Greed, despite appearing strong on Sharpe, performed poorly on Sortino due to losses.

Sharpe vs Sortino Ratios by Sentiment
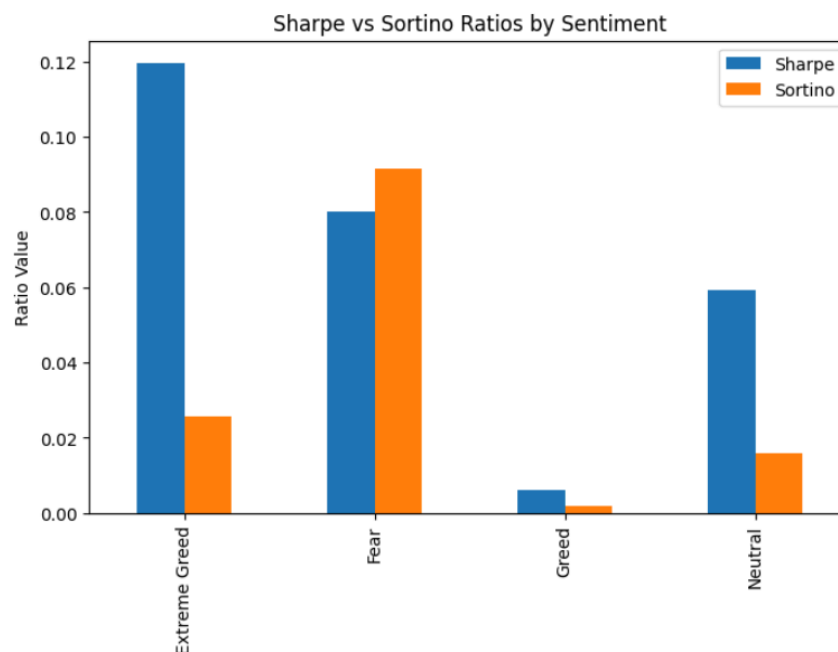
7. Machine Learning Classification

Machine learning models were applied to predict trade outcomes (Win vs. Loss). XGBoost delivered the strongest results (F1 = 98.7%), followed closely by Random Forest (F1 = 98.3%) and Logistic Regression (F1 = 94.9%). Feature importance analysis revealed that trade execution features (side, open/close long or short, execution price, and position size) were far more influential than the sentiment classifications themselves. While sentiment captures the broader environment, the mechanics of trade execution ultimately determine individual success.

Table 7. Model Performance Metrics

Model	Accuracy	Precision	Recall	F1 Score
Logistic Regression	94.7%	90.4%	99.8%	94.9%

Model	Accuracy	Precision	Recall	F1 Score
Random Forest	98.3%	97.0%	99.8%	98.3%
XGBoost	98.7%	97.8%	99.6%	98.7%

Figure 6. Feature Importance (Random Forest vs. XGBoost)
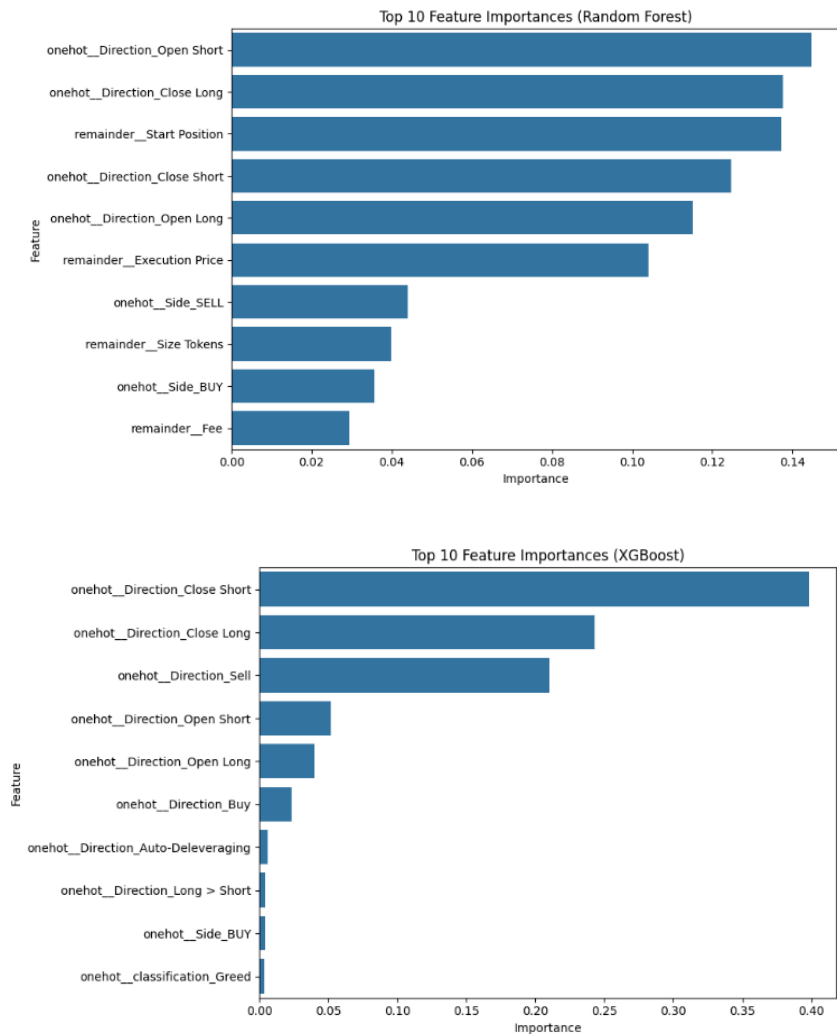
Both models showed that execution features (direction, side, position size, execution price) were far more influential than sentiment variables in predicting profitable trades.

Inference :

The findings demonstrate that market sentiment significantly shapes trading outcomes. **Fear-driven markets produced the strongest and most consistent profitability, suggesting that traders are more disciplined under adverse sentiment**. Extreme Greed produced high win rates but large downside volatility, making it riskier despite nominal profitability. Greed conditions consistently led to weak outcomes, both in absolute and risk-adjusted terms.

Machine learning analysis confirmed that **sentiment, while important contextually, is not the primary driver of individual trade success.** Execution-related features dominate predictive power, underscoring the importance of strategy design at the trade mechanics level.

Conclusion

This study confirms that sentiment regimes influence trader performance but in nuanced ways. Fear markets provide the most favorable balance of profitability and risk, while Greed should be avoided due to poor outcomes. Extreme Greed can generate profits but requires strict risk management. Neutral markets are moderate and suitable for conservative strategies.

Crucially, **execution features — trade side, direction, and sizing — play a larger role than sentiment in predicting profitable outcomes. Therefore, sentiment should be incorporated as an overlay, while execution mechanics remain the core driver of strategy performance.**