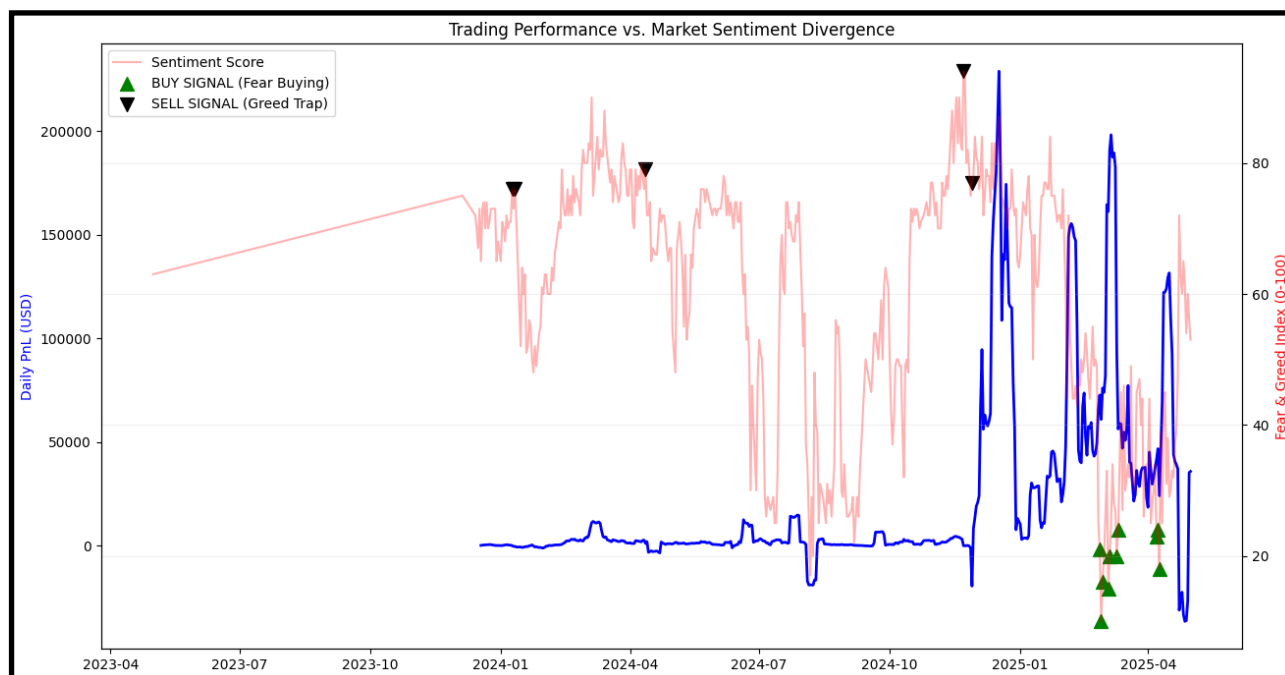# REPORT

Trader Performance vs Market Sentiment Analysis

This project analyzes the relationship between cryptocurrency trader behavior and market sentiment (Fear vs Greed) using historical trade data and the Fear & Greed Index.The objective is to understand whether traders align with market psychology or diverge from it, and to identify behavioral patterns that can inform smarter, risk-aware trading strategies.

Step by step detail of what was done to achieve the output visuals-

- Loaded historical trader data and daily Fear & Greed Index values. Converted timestamps into a common daily format to ensure accurate alignment.
- Aggregated individual trades into daily behavioral metrics. To compare how traders behaved on a given day with how the market felt on that same day.
- From raw trade data, the following daily metrics were computed:
- Daily PnL: Sum of all closed profits and losses
- Trading Volume: Total USD traded per day
- Trade Activity: Number of trades executed
- Risk Exposure: Volatility of daily PnL (standard deviation)
- Leverage / Exposure Proxy: Relative daily trading size compared to normal activity.
- To quantify trader profitability, aggressiveness, and risk-taking behavior. Two rule-based behavioral signals were defined:
    1. BUY Signal (Fear Buying): Triggered when market sentiment is extremely low (Fear) while trading activity remains high.
    2. SELL Signal (Greed Trap):Triggered when market sentiment is extremely high (Greed) but traders experience losses.

Trading Performance vs. Market Sentiment Divergence

The Output shows:

Profitability often declines during extreme Greed, despite high optimism. Fear-driven periods frequently precede PnL recovery. BUY signals appear near sentiment bottoms, while SELL signals cluster near sentiment peaks. Blue line (left axis) represents Daily Trading PnL (USD).Red line (right axis) represents Fear & Greed Index (0–100). Green ▲ markers represents BUY signals during extreme Fear. Black ▼ markers represents SELL signals during extreme Greed

Observations:

1. Profitability often diverges from sentiment extremes:

- During high Greed phases (Sentiment > 75), marked by black ▼ signals Market optimism peaks and Trading PnL frequently stagnates or declines.

- Several SELL signals coincide with local P&L tops or subsequent drawdowns

2. Fear-driven periods create asymmetric upside opportunities:

- Green ▲ BUY signals appear during deep Fear (Sentiment < 25).

- These points are often followed by PnL recovery and Reduced downside volatility

- Even when short-term losses occur, medium-term performance improves.

3. Volatility spikes during sentiment transitions:

- Large PnL swings occur when sentiment rapidly shifts from Fear → Greed or vice versa.

- These transitions reflect Market uncertainty,Increased emotional trading,Higher probability of execution errors.

4. Crowd behavior compresses alpha during Greed:

- Extended Greed periods shows High sentiment, Flattening or noisy PnL outcomes

- This indicates crowded positioning and reduced differentiation among traders.
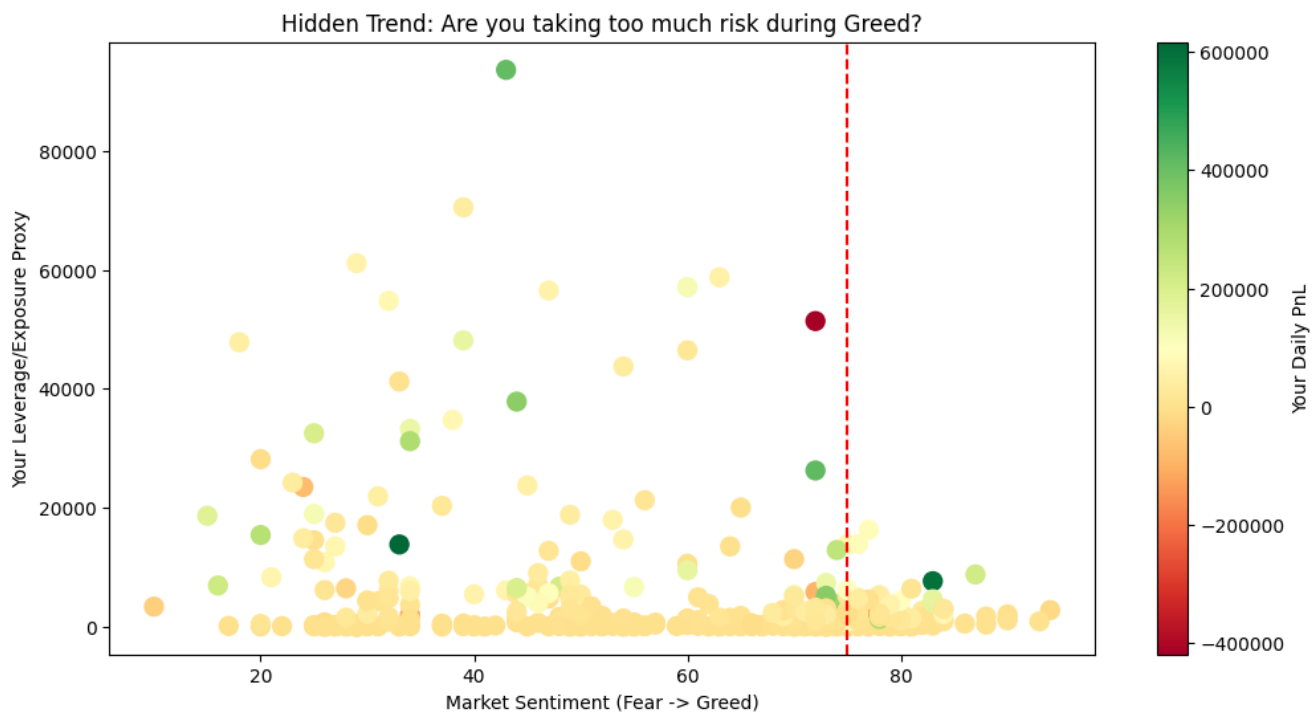
Conclusion:

This analysis demonstrates that market sentiment and trading performance are not linearly aligned. The most consistent trading opportunities arise when trader behaviour diverges from crowd emotion:

- Fear signals Opportunity

- Greed signals Risk

By incorporating sentiment-aware risk management, traders can avoid emotional traps and improve long-term profitability in volatile crypto markets.

Actionable Takeaways :

- Use sentiment as a timing filter, not a directional signal. Reduce exposure during Extreme Greed

- Accumulate selectively during Fear, with controlled risk

The Output Image shows -

Traders take higher risk during Greed, but profits do not consistently improve. High exposure during Greed is frequently associated with flat or negative returns. Controlled exposure during Fear leads to better risk-adjusted outcomes.X-axis represents Market Sentiment (Fear → Greed, 0–100) Y-axis represents Trader Risk Exposure (Leverage / Exposure Proxy).Color scale represents Daily Profit & Loss (Green = Profit, Red = Loss).Red dashed line (~75) represents Extreme Greed threshold.

Observations

1 .Risk exposure increases during Greed — but profits do not

- As sentiment moves toward Greed (>60), traders tend to increase exposure, indicating higher risk appetite.

- However, higher leverage during Greed does not consistently translate into higher profits.

- Several high-exposure points near extreme Greed are colored yellow to red, indicating flat or negative PnL.

2. Extreme Greed is associated with loss concentration

- To the right of the red dashed line (Sentiment > 75): Risk exposure remains elevated and PnL outcomes skew neutral to negative

- This pattern suggests late entries and FOMO-driven trades.

3. Fear periods show asymmetric risk-reward behavior

- During Fear to Neutral sentiment (20–50): Most traders keep lower exposure yet, some high-profit (dark green) days appear even at moderate exposure

- This suggests selective risk-taking during Fear can be rewarded.

4. Profitability is more dispersed during Fear, compressed during Greed

- Fear regimes show wider PnL dispersion (both wins and losses)

- Greed regimes show PnL compression around zero or losses

Conclusion

This analysis reveals a behavioral bias that Traders systematically take more risk when the market is most optimistic, but this behavior often results in lower or negative profitability.Conversely, measured risk-taking during fearful periods shows stronger profit potential. This divergence between sentiment and optimal behavior highlights the importance of contrarian risk management strategies in crypto trading environments.

Actionable Takeaways

- Avoid leverage expansion during Extreme Greed

- Favor disciplined, lower-exposure entries during Fear

- Market sentiment should be used as a risk-control signal, not a directional signal

- Best performance emerges when trader behavior diverges from crowd psychology