Trader Behavior vs Market Sentiment (Fear & Greed)

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1. Introduction

This project analyzes how trader behavior varies under different Bitcoin market sentiment regimes—Fear and Greed—using real execution data from Hyperliquid. The objective is to understand how profitability, trade exposure, and execution quality change with market emotion and to derive insights that can inform smarter trading and risk management strategies.

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2. Datasets Used

1. **Historical Trader Execution Data**
    - Key columns: `Timestamp IST`, `Execution Price`, `Size`, `side`, `Closed PnL`
2. **Bitcoin Market Sentiment Dataset**
    - Columns: `date`, `classification` (Fear / Greed)

Trade timestamps were normalized and aligned with daily market sentiment to enable sentiment-aware behavioral analysis.

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3. Methodology

- Converted trade timestamps (`Timestamp IST`) into datetime format and extracted execution dates.
- Merged trader data with daily Fear & Greed sentiment using the date key.
- Engineered behavioral features:

    - **Trade Volume (Exposure):** `size × execution price`
    - **Profitability Flag:** `closedPnL > 0`
- Since leverage data was unavailable, trade exposure was used as a proxy for trader risk-taking behavior.

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4. Key Findings

Profitability

- Average PnL differs across sentiment regimes.
- Greed phases show higher activity but weaker risk-adjusted performance.

Win Rate

- Win rates are consistently higher during Fear periods.
- Indicates more disciplined and selective trading behavior.

Trade Exposure

- Trade volume is significantly higher during Greed.
- Suggests overconfidence and increased risk-taking during optimistic markets.

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5. Hidden Behavioral Insights

- Emotional overconfidence during Greed leads to larger exposure but lower execution quality.
- Fear-driven markets reward controlled risk and better decision-making.
- Market sentiment influences *how* traders trade, not just *how often*.

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6. Trading Strategy Implications

- Use sentiment as a **risk modulation signal**, not a directional signal.
- Reduce position size during Greed to limit downside risk.
- Allow selective, high-conviction trades during Fear with controlled exposure.
- Sentiment-aware exposure control can improve long-term performance.

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7. Conclusion

Trader behavior is strongly influenced by market sentiment. By quantifying these behavioral shifts, sentiment can be systematically integrated into risk management frameworks to improve execution quality and reduce drawdowns in volatile crypto markets.