Trader Behavior Insights Based on Market Sentiment

1. Introduction

This project analyzes the relationship between trader behavior and overall market sentiment in cryptocurrency markets. Using historical trader data from Hyperliquid and the Bitcoin Fear & Greed Index, the objective is to identify how trader profitability, leverage usage, and risk-taking behavior vary across different sentiment regimes.

Understanding these patterns can help trading platforms and traders design sentiment-aware risk controls and improve long-term performance.

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2. Datasets Used

2.1 Historical Trader Data (Hyperliquid)

- Account ID
- Trade size and execution price
- Trade direction (Buy/Sell)
- Leverage
- Closed PnL
- Timestamp of trades

2.2 Bitcoin Fear & Greed Index

- Daily market sentiment classification:
  - **Fear**
  - **Greed**

The datasets were merged using trade execution date.

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3. Data Preparation & Feature Engineering

Key preprocessing steps included:

- Timestamp conversion to daily granularity
- Removal of trades with missing PnL
- Merging trader data with sentiment data

Engineered Features:

- **Trade Volume** = |size × execution price|
- **Win Rate** = Percentage of profitable trades
- **Risk Score** = Trade Volume × Leverage
- **Risk-Adjusted PnL** = Closed PnL / Risk Score

4. Exploratory Data Analysis

4.1 Profitability vs Market Sentiment

- Greed periods show higher trading activity.
- Average PnL does not increase proportionally during Greed.

4.2 Leverage Usage

- Leverage is significantly higher during Greed periods.
- Fear markets demonstrate more conservative positioning.

4.3 Win Rate

- Win rate declines during Greed, indicating overconfidence.
- Fear periods show fewer trades but better accuracy.

4.4 Risk-Adjusted Performance

- Risk-adjusted returns are **higher during Fear markets**, highlighting superior capital efficiency.

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5. Trader Skill Segmentation

Traders were segmented into:

- **Top Traders** (Top 20 by cumulative PnL)
- **Other Traders**

Key Observations:

- Top traders **reduce leverage during Greed**.
- Other traders increase leverage during Greed, leading to poorer outcomes.
- Discipline, not frequency, drives long-term profitability.

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6. Key Insights

- Market sentiment significantly influences trader behavior.
- Greed amplifies risk-taking but reduces trade quality.
- Fear markets reward disciplined risk management.
- Successful traders adapt their leverage dynamically based on sentiment.
- Sentiment-aware strategies can reduce drawdowns and improve consistency.

7. Trading Strategy Implications

- Introduce **leverage caps during Greed periods**
- Encourage **risk-adjusted metrics** over raw PnL
- Implement **sentiment-based risk alerts**
- Promote disciplined trading behavior during euphoric markets

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8. Conclusion

This analysis demonstrates that market sentiment is a powerful driver of trader behavior. While Greed markets attract activity, sustainable profitability is achieved through disciplined risk management — a trait consistently exhibited by top-performing traders.

Incorporating sentiment-aware controls can significantly enhance trading performance and platform-level risk management.