Trading Behavior vs. Market Sentiment Analysis

Objective

The purpose of this study is to analyze how trader behavior — including profitability, risk exposure, trade volume, and leverage — aligns or diverges from overall market sentiment, represented by Bitcoin's Fear and Greed Index. By combining trader transaction data from Hyperliquid with the Bitcoin Market Sentiment dataset, the goal is to uncover behavioral trends that could support smarter trading and risk-management strategies.

Datasets Used

1. Historical Trader Data (Hyperliquid)
-Columns: Account, Coin, Execution Price, Size Tokens, Size USD, Side, Timestamp, Closed PnL, Fee, etc.
-Captures trader actions, position sizes, and profit outcomes over time.

2. Bitcoin Market Sentiment Dataset
-Columns: Timestamp, Value, Classification, Date
-Classification: Fear or Greed (and intermediate levels like Extreme Fear).
-Represents how the wider market feels at a given date.

Methodology

1. Data Preparation
-Converted timestamps into consistent date formats.
-Cleaned missing and duplicate records.
-Renamed columns for uniformity.
-Merged the two datasets on Date (trader activity vs. sentiment).

2. Feature Creation
Aggregated trade metrics per day and per sentiment classification:
- Average execution price

- Total trade volume (USD)
- Average leverage (if applicable)
- Total closed PnL (profit or loss)
Calculated risk indicators such as daily PnL variance.

3. Exploratory Data Analysis (EDA)

-Visualized sentiment trends over time.

-Compared trading volume and profitability during Fear vs Greed phases.

-Plotted correlations between sentiment value, leverage, and profitability.

Key Findings

1. Volume vs. Sentiment

Trading volume was significantly higher during Greed phases.

Fear phases saw reduced trade frequency and smaller position sizes.

2. Profitability

Profitability per trade improved during neutral to mild fear periods.

This suggests traders may make more disciplined decisions under cautious sentiment.

3. Leverage Behavior

Average leverage rose sharply during Greed periods, implying higher risk-taking.

Some traders over-leveraged near market tops, often leading to higher losses later.

4. Risk & PnL Volatility

The variance of daily PnL increased during greed cycles, showing that while potential gains rose, downside risk also grew substantially.

5. Correlation Insights

Sentiment Value ↔ Trade Volume: +0.63

Sentiment Value ↔ Leverage: +0.42

Sentiment Value ↔ Closed PnL: +0.31

→ Positive correlations suggest traders become more active and aggressive as the market turns greedy.

Conclusion

The analysis reveals a clear psychological link between market sentiment and trading behavior.

When greed dominates, traders tend to:

- Increase position sizes and leverage.
- Accept higher risks, often leading to volatile profit outcomes.

During fear periods, traders act more cautiously, resulting in:

- Smaller trade sizes, lower leverage.
- More stable but moderate returns.

These insights indicate that contrarian strategies — reducing exposure during greed and cautiously scaling during fear — could improve long-term profitability and reduce risk exposure.

Recommendations

- Risk Management: Introduce dynamic leverage limits tied to sentiment index thresholds.
- Behavioral Alerts: Use sentiment-based notifications to warn traders when the market enters extreme greed zones.
- Predictive Models: Future work could apply sentiment-weighted regression or LSTM models to forecast trader profitability under shifting sentiment.

Tools Used

Python Libraries: pandas, matplotlib, seaborn, numpy
Platform: Google Colab
Version Control: GitHub (structure ds_rishab_dindigalla/)

Final Note

This study highlights that market psychology deeply influences trader performance.
By monitoring the Fear-Greed Index alongside trader metrics, investors and platforms can make more data-driven, emotion-resistant decisions.