Trader Performance vs Market Sentiment

Data Science / Analytics Intern – Round-0 Assignment

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1. Objective

The objective of this analysis is to study how Bitcoin market sentiment (Fear vs Greed) influences trader behavior and performance on the Hyperliquid platform. The goal is to uncover actionable patterns that can help design smarter and more risk-aware trading strategies.

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2. Dataset Overview

2.1 Bitcoin Market Sentiment Dataset

- Contains daily market sentiment classified as **Fear** or **Greed**
- Used to represent overall market psychology

2.2 Historical Trader Data (Hyperliquid)

- Transaction-level trading data
- Includes execution price, trade size, side, timestamps, and closed PnL
- Used to analyze trader performance and behavior

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3. Methodology

1. Loaded both datasets and inspected dimensions, missing values, and duplicates.
2. Converted timestamps into datetime format and aligned both datasets at a **daily level**.
3. Merged trader data with sentiment data using the trading date.
4. Engineered key metrics such as:
    - Trade volume (USD exposure)
    - Profitability indicator
    - Win rate
    - Trade frequency
    - Long/Short bias
5. Performed exploratory data analysis comparing trader behavior during Fear and Greed market conditions.

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4. Key Findings

- **Trade volume increases significantly during Greed periods**, indicating higher risk appetite and aggressive participation.
- **Profitability is more stable during Fear periods**, despite lower trading activity.
- **Win rate does not improve proportionally during Greed markets**, suggesting emotional or over-leveraged trading behavior.
- Traders tend to increase trade frequency and exposure during Greed, resulting in higher volatility rather than consistent gains.

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5. Segment Analysis

- **High vs Low Leverage Traders**
  High leverage traders experience larger profit swings during Greed, while low leverage traders show more consistent performance during Fear.
- **Frequent vs Infrequent Traders**
  Increased frequency during Greed does not translate to higher win rates, indicating diminishing returns from over-trading.

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6. Strategy Recommendations (Actionable Output)

1. **During Fear periods**, traders should reduce leverage and focus on high-probability setups, as risk-adjusted returns are more stable.
2. **During Greed periods**, position sizing discipline is critical; increased volume and leverage should be avoided unless supported by strong signals.

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7. Conclusion

Market sentiment has a clear impact on trader behavior and performance. Fear markets encourage cautious but stable trading outcomes, while Greed markets amplify risk-taking without guaranteeing improved returns. Incorporating sentiment awareness into trading strategies can improve long-term consistency and risk management.