Trader Behavior & Market Sentiment Analysis

Junior Data Scientist Assignment – Web3 Trading Team

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Google Colab: 🔗 primetrade.ipynb

Project Overview

This project explores the relationship between Bitcoin market sentiment (Fear & Greed Index) and trader behavior on the Hyperliquid trading platform. The objective is to analyze how market sentiment influences trading profitability, capital exposure, trade aggressiveness, and overall trading performance, and to generate actionable insights for smarter trading strategies.

Key Objectives

- Analyze trader profitability across different market sentiment phases

- Study how capital exposure and trading aggressiveness change with sentiment

- Identify hidden patterns influencing trading performance

- Provide data-driven strategic insights for Web3 trading optimization

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Datasets Used

1. Bitcoin Market Sentiment Dataset

- **Columns:** timestamp, value, classification, date

- **Source:** Fear & Greed Index

2. Historical Trader Data (Hyperliquid)

- **Columns:** Account, Coin, Execution Price, Size Tokens, Size USD, Side, Timestamp, Closed PnL, etc.

Tools & Technologies

- Python

- Google Colab

- Pandas

- NumPy

- Matplotlib

- Seaborn

- SciPy

Methodology

1. Data Cleaning & Preprocessing

2. Feature Engineering (trade volume, profit flag, capital exposure)

3. Dataset Merging using trade date

4. Exploratory Data Analysis (EDA)

5. Statistical Testing (t-test)

6. Correlation & Risk Analysis

7. Insight Generation & Strategy Recommendations
8. Use of **leverage proxy** - This is **higher-level financial analytics**.
● Exchange leverage data is often **hidden**

● Capital exposure gives **real economic risk**

● The risk index gives a **normalized comparison**

Key Insights

● Trader profitability **peaks during Extreme Greed phases**

● **Capital exposure and trading aggressiveness increase significantly during Greed markets**

● **Win rate is highest during Greed and lowest during Extreme Fear**

● Trade volume increases during Fear due to **high volatility and repositioning**

● Market sentiment strongly influences **risk appetite and trading behavior**

Strategic Recommendations

● Implement **sentiment-based capital allocation**

● Reduce risk exposure during **Fear phases**

● Increase position sizing during **Greed phases**

● Integrate sentiment signals into **algorithmic trading strategies**

Business Value

- Improved **risk-adjusted returns**

- Better **capital efficiency**

- Smarter **automated trading strategies**

- Enhanced **market decision intelligence**

Conclusion – Trading Behavior & Market Sentiment

The correlation reveals strong structural relationships between trade sizing, capital exposure, and profitability. The most influential factors driving trading performance are capital deployment and trade aggressiveness, rather than asset prices alone.

Key Strategic Insights:

- Trade volume and capital exposure show the highest positive correlation with profitability, confirming that position sizing plays a critical role in determining trade outcomes.

- Execution price exhibits relatively weak correlation with profits, suggesting that timing and position management dominate price selection strategies.

- Profitability is strongly linked to trading intensity and capital commitment, particularly during Greed and Extreme Greed market regimes.

Final Strategic Insight:

Market sentiment acts as a powerful macro signal that shapes traders' risk appetite, capital deployment, and overall trading profitability. Traders dynamically scale their exposure based on sentiment, increasing risk during Greed phases and reducing exposure during Fear regimes.