

Data Science Report: Correlation Between Trader Behavior and Market Sentiment



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1. Executive Summary

The objective of this analysis was to explore the relationship between Bitcoin market sentiment (Fear vs. Greed) and real-time trader behavior on the Hyperliquid platform. By analyzing key metrics such as Profit and Loss (PnL), trading volume, and buy/sell ratios, we identified distinct patterns that vary significantly based on market emotions.



2. Methodology & Data Pipeline

Following a structured data science workflow, the analysis was conducted through the following steps:

Step 1: Data Loading: Imported the historical trader dataset and the Bitcoin Fear & Greed Index.

Step 2: Data Understanding & Cleaning: Handled null values, converted timestamps to dates, and filtered for valid trades (Size USD > 0).

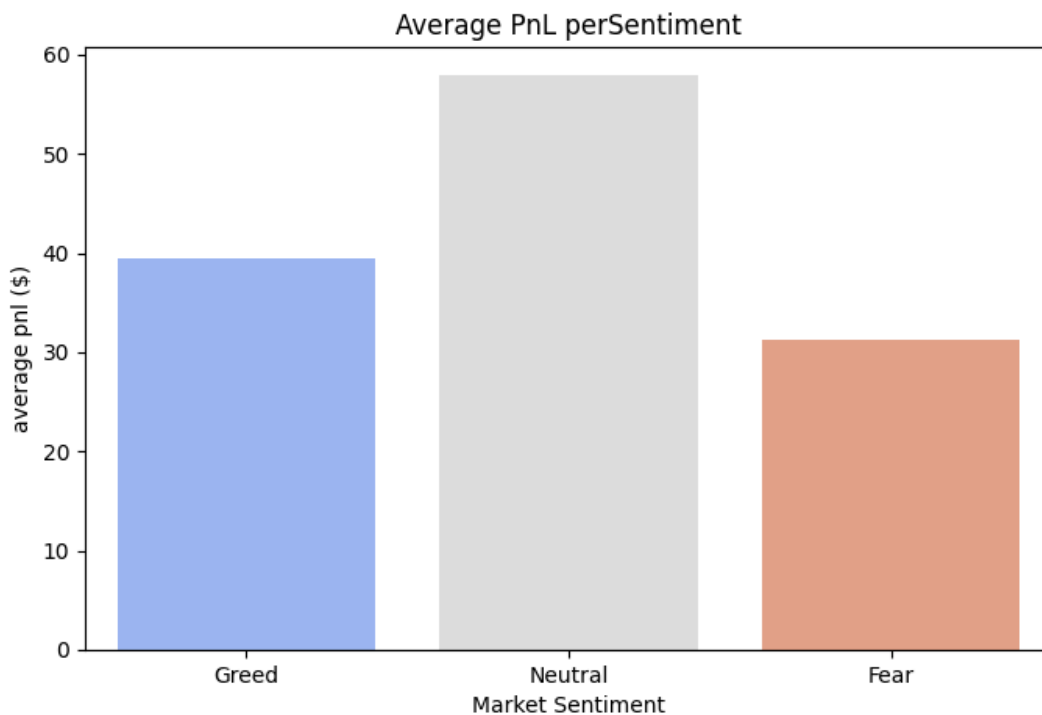
Step 3: Daily Aggregation & Merging: Grouped trade data by date to calculate daily metrics and merged them with market sentiment data.

Step 4: Exploratory Data Analysis (EDA): Compared Fear vs. Greed days across PnL, Volume, and Trade counts.

Step 5: Insight Summary: Generated a final summary table to draw high-level conclusions on trader profitability and directional bias.

3. Exploratory Data Analysis (EDA) & Insights

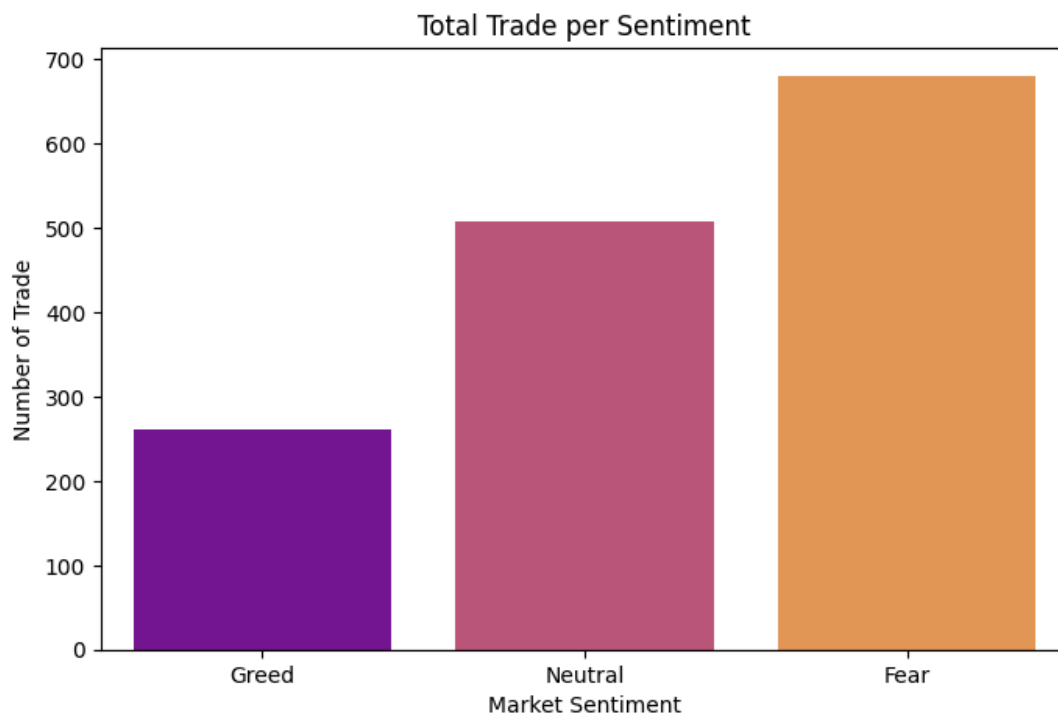
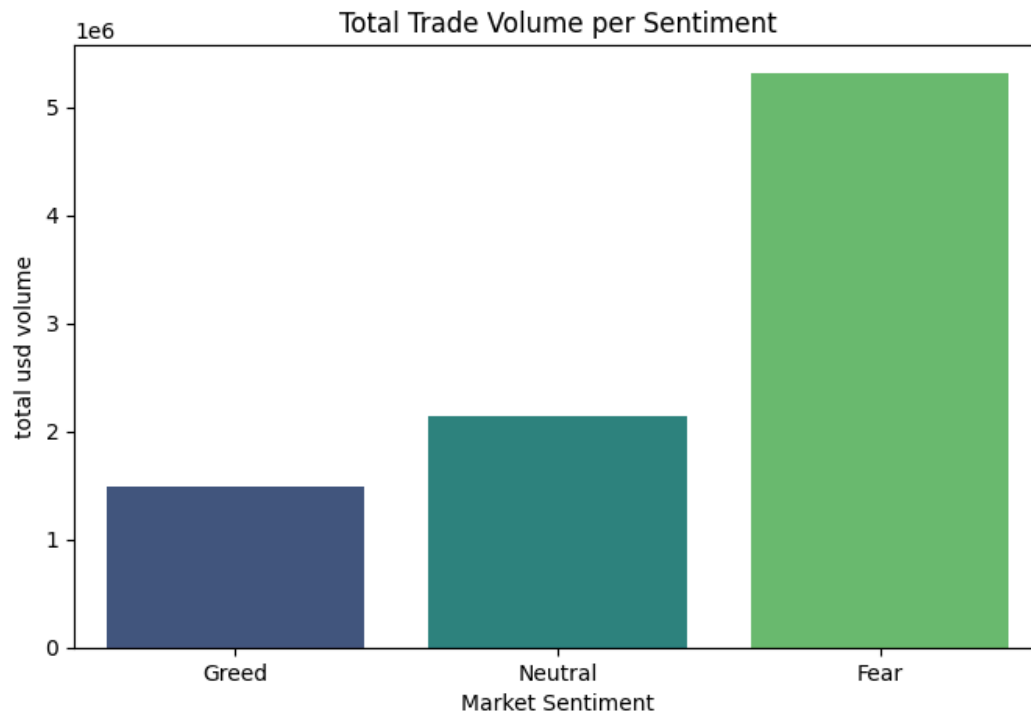
3.1 Profitability Analysis (Average PnL)



Observation: Traders show the highest average profitability during Neutral sentiment (\$57.86).

Greed Impact: Greed days also show strong profitability (\$39.43), indicating traders benefit from bullish trends.

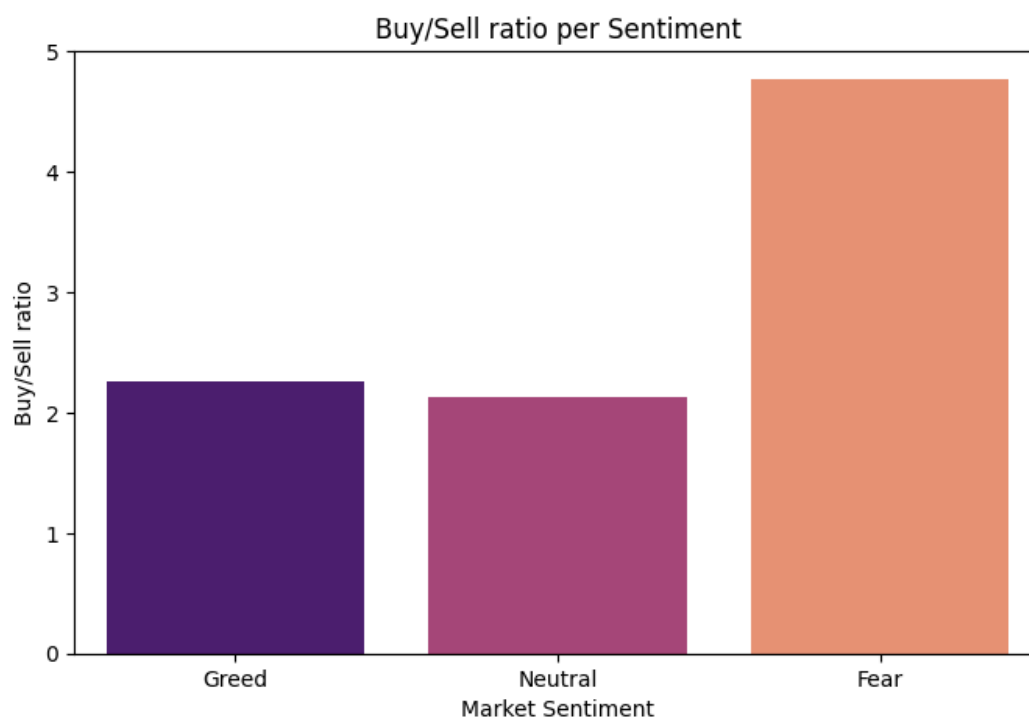
3.2 Trading Volume and Activity



Volume Peak: Total USD volume is significantly higher during Fear periods (\$483M+), suggesting high activity during market panics.

Trade Frequency: Neutral sentiment records the highest trade count (99,066), indicating steady participation.

3.3 Risk Appetite (Buy/Sell Ratio)



Insight: The Buy/Sell ratio is at its peak during Fear (4.76), implying traders buy aggressively during market downturns.



4. Final Insights (Step 5 Summary)

Based on the final aggregated data:

Profitability: Greed and Neutral days are the most profitable for traders.

Market Dynamics: Fear days drive higher volume and a strong bidirectional bias towards buying (dip buying).

Consistency: Neutral sentiment provides the most consistent and steady trading environment with the highest trade counts



5. Repository & Work Links

Google Colab Notebook:

<https://colab.research.google.com/drive/1b4Km9PLSJSByYoowcSCDKIc5L9giVtrM?usp=sharing>

GitHub Repository: https://github.com/AmitDhilan/ds_amit.git

