

Trader Behavior Insights: Final Report

Nasrat Jahan

July 5, 2025

1. Objective

The goal of this assignment was to explore the relationship between trader performance and market sentiment using two datasets: a Bitcoin Market Sentiment Dataset and a Historical Trader Data from Hyperliquid. Through exploratory data analysis (EDA), we aimed to uncover patterns, relationships, and insights that could support smarter trading strategies.

2. Dataset Overview

2.1 Historical Trader Data

This dataset consists of over 211,225 records with details such as execution price, size, side, start position, closed PnL, leverage, direction, and timestamps.

2.2 Fear-Greed Index

This dataset contains around 2,645 daily records of market sentiment classified as *Extreme Fear*, *Fear*, *Neutral*, *Greed*, or *Extreme Greed*, along with a numerical sentiment value.

The two datasets were merged on date for analysis.

3. Exploratory Data Analysis

Univariate Analysis

- Most trades occurred under **Fear**, followed by Neutral and Greed.
- **Extreme Greed** showed the highest average Closed PnL.
- Total USD trade volume peaked under **Fear**, showing high activity during uncertain periods.

PnL Distributions & Drivers

- PnL is generally centered around 0. Extreme sentiments lead to higher outliers.
- Larger trade sizes and start positions correlate with higher PnL variability.

Multivariate Analysis

- **Catplot:** BUY trades have higher variance and more extreme outcomes.
- **KDE:** Most sentiments cluster around 0 PnL, with Greed showing a longer positive tail.
- **FacetGrid:** Fees increase with trade size across sentiments.
- **Heatmap:** Greed sentiment shows highest variability in gains/losses.

Directional Analysis

- Open Long and Close Long were most common under Extreme Fear.
- Rare directions like Liquidated Shorts occurred in extreme sentiments and often caused large losses.
- Average PnL by sentiment: **Extreme Greed > Fear > Greed > Neutral > Extreme Fear**

Time-Based Trends

- The Fear-Greed Index fluctuates frequently; Fear is the dominant sentiment.
- Trade counts spike on key days, possibly reflecting external market triggers.
- Average daily PnL hovers near 0, with few profitable outlier days.

Final Insights & Recommendations

- **Sentiment Drives Performance:** Traders perform better in Extreme Greed but face more risk.
- **Direction Matters:** Exit and rare directions show high variability; handle with caution.
- **Trade Size and Leverage:** Larger positions create bigger swings in PnL; risk control is key.
- **Time Entry:** Profitable days often align with positive sentiment; timing matters.
- **Avoid Rare Events:** Rare directions like liquidation often lead to negative outcomes.

5. Tools Used

- Python (pandas, seaborn, matplotlib)
- Jupyter Notebook

GitHub Repository: <https://github.com/jahannasrat0607/trader-behavior-insights>