

Trader Performance Analysis Across Market Sentiments

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Internship: [Primetrade.ai Data Science internship]

Date: September 2025

1. Project Overview

This project analyzes the relationship between **Bitcoin market sentiment (Fear/Greed Index)** and **trader performance** using historical trading data. The goal is to uncover patterns in how traders behave under different sentiment regimes (Fear, Greed, Extreme conditions, Neutral) and identify traders who consistently adapt or show contrarian strength.

Key objectives:

- Analyze trader behavior in **Fear**, **Neutral**, and **Greed** market regimes.
- Examine correlations between metrics like totalPnL, avgPnL, winRate, tradeCount, and Sharpe ratio.
- Identify **consistent or contrarian traders** for strategy insights.

2. Dataset

Historical Trader Data (Hyperliquid)

- Columns: Account, Coin, Execution Price, Size USD, Side, Timestamp, Closed PnL, etc.
- ~211k trade records.

Fear & Greed Index

- Columns: date, value, classification (Extreme Fear, Fear, Neutral, Greed, Extreme Greed).
- ~2600 records (daily sentiment)

3. Methodology

1. Data Preparation

- Converted timestamps to datetime, aligned trades with daily sentiment classification.
- Merged trader data with sentiment dataset on date.

2. Feature Engineering & Metrics

For each **trader** × **sentiment regime**:

- **Total PnL** (sum of profits/losses)
- **Average PnL** per trade
- **Trade Count**
- **Win Rate** (% profitable trades)
- **Sharpe Ratio** (risk-adjusted return)
- **Rank** of traders within each sentiment regime by total PnL

3. Visualization

- Boxplot → Distribution of PnL under different sentiment regimes
- Barplot → Top 10 traders by PnL (per sentiment regime)
- Heatmap → Correlation between performance metrics

4. Key Insights & Conclusions

1. Trader behavior varies with market sentiment

- Some traders excel during **Fear/Extreme Fear** periods — these are **contrarian traders**, profiting when others panic.

- Most traders perform better in **Greed/Extreme Greed** periods, following herd behavior.
- **Neutral market periods** showed mixed results with no strong bias.

2. Consistency is crucial

- Only a **small group of traders** maintained consistent profitability across multiple market regimes.
- Many traders performed well in one sentiment regime but poorly in others.

3. Metrics correlation

- totalPnL correlates strongly with avgPnL and winRate — traders with higher win rates tend to earn more.
- tradeCount (number of trades) **does not guarantee profits** — quality of trades matters more than quantity.
- Sharpe ratios indicate that some **high-PnL traders have unstable returns**, implying higher risk.

4. Standout traders and rankings

- In each sentiment class, a few traders consistently ranked at the top.
- These traders can serve as **benchmarks or signals** for strategy development.

Plain Language Summary

- **Market mood strongly influences trader performance.**
- Most traders profit when the market is greedy, while a rare few thrive in fearful conditions.
- More trades \neq more profits — timing and skill matter.
- Identifying consistent or contrarian traders can help design **smarter, sentiment-aware trading strategies.**

5. Future Work

- Expand analysis to **more granular timeframes** (e.g., daily, weekly)
- Include **sector-based sentiment analysis** for deeper insights
- Apply **predictive models** to forecast trader performance based on sentiment

6. Tools & Technologies Used

- **Programming:** Python
- **Libraries:** Pandas, NumPy, Matplotlib, Seaborn, Scikit-learn
- **Environment:** Jupyter Notebook, Google Colab

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Date: 09 September 2025