# Trader Performance & Market Sentiment Analysis

**1. Introduction:**

The objective of this project is to explore the relationship between Bitcoin market sentiment (Fear/Greed Index) and trader performance using Hyperliquid’s historical trading data.

Market sentiment often influences trader psychology, which in turn impacts trading decisions such as entry/exit timing, position sizing, and risk exposure. By analyzing these datasets together, we aim to uncover hidden patterns that can drive smarter and more resilient trading strategies.

**2. Datasets Used**

**Bitcoin Market Sentiment Dataset**

* **Columns:** Date, Classification (Fear / Greed)
* **Description:** Represents crowd psychology through the Fear & Greed Index.

**Hyperliquid Historical Trader Data**

* **Columns:** Account, Symbol, Execution Price, Trade Volume, Profit/Loss (PnL)
* **Description:** Captures real trader activity, execution behavior, and profitability.

**Preprocessing Steps:**

* Converted timestamps to a consistent format.
* Merged sentiment data with trading records by date.
* Removed incomplete/missing values.
* Generated derived metrics (daily PnL averages, win rates, exposure under fear vs. greed).

**3. Methodology / Approach**

1. **Data Preprocessing** – Standardized and merged datasets, aligned by trading days.
2. **Exploratory Data Analysis (EDA)** – Visualized sentiment cycles, trader returns, and trading volumes.
3. **Feature Engineering** – Classified trades into “Fear” vs. “Greed” regimes.
4. **Comparative Analysis** – Compared performance metrics across different sentiment conditions.
5. **Statistical Correlations** – Measured associations between sentiment classification and trading outcomes.
6. **Visualization** – Plotted key trends (saved in outputs/).

**4. Key Findings / Insights**

* **Fear Periods:** Traders adopted more conservative positions, leading to **lower volatility and smaller but safer profits**.
* **Greed Periods:** Higher trade frequency and aggressive position sizing were observed, often resulting in **larger profits but higher losses** for less disciplined accounts.
* **Consistency Matters:** A small subset of traders maintained steady performance across both regimes, suggesting that **rule-based strategies outperform sentiment-driven trading**.
* **Correlation Evidence:** PnL volatility showed a strong positive correlation with “Greed” sentiment days, while win-rate consistency was higher in “Fear” periods.

**5. Visual Outputs**

Key charts included (from outputs/ folder):

* **Sentiment Trends:** Fear and Greed cycles over time.
* **Performance Distributions:** PnL histograms under fear vs. greed.
* **Comparative Analysis:** Trader profitability segmented by sentiment.
* **Correlation Heatmap:** Relationships between sentiment and performance metrics.

**6. Conclusion & Recommendations**

This analysis demonstrates that **market sentiment significantly influences trading behavior**. Traders are prone to over-exposure during greed phases, while being overly cautious during fear phases.

**Recommendations:**

* Treat sentiment as a **risk management signal** rather than a direct trading trigger.
* Apply **separate strategy backtests** under fear vs. greed conditions to identify robustness.
* Encourage **discipline and rule-based systems**, as they perform consistently regardless of sentiment regime.
* Monitor greed periods for **opportunity with caution**, as they present both high upside and high risk.