Trader Behavior Insights – Assignment Report

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1. Objective

The goal of this analysis was to explore how trader performance changes depending on the overall Bitcoin market sentiment — whether it's a "Fear" phase or a "Greed" phase. I worked with two datasets:

1. Fear & Greed Index – daily sentiment classification and score.
2. Historical Trader Data from Hyperliquid – individual trades with details like trade size, PnL, and side (buy/sell).

2. Approach

- Data Cleaning: Fixed date formats in both datasets, removed any unnecessary columns, and merged them based on date.

- Merging Sentiment & Trades: Each trade got tagged with the sentiment score and category from that day.

- Exploratory Data Analysis (EDA): Looked at how Closed PnL, trade sizes, and win rates varied between sentiment phases.

- Extra Analysis (Notebook 2): Checked correlations, built a simple linear regression to see if sentiment score and trade size predict PnL, and grouped traders into "high risk" or "low risk" categories.

3. Key Findings

- PnL and Sentiment: On average, traders did slightly better during "Greed" phases than "Fear" phases, but the difference wasn't dramatic.
- Trade Size Patterns: Larger trades tended to happen more often in "Greed" conditions.
- Win Rates: Win rate differences between Fear and Greed were small, showing many traders keep the same strategies regardless of sentiment.
- Regression Model: The simple linear model had almost no predictive power ($R^2 \sim 0$), meaning PnL is influenced by more complex, non-linear factors than just sentiment, trade size, and fees.
- Trader Segmentation:

    o High Risk in Greed: Larger trades when market is greedy.
    o High Risk in Fear: Larger trades when market is fearful.
    o Low Risk: Smaller trades, regardless of sentiment.

4. Challenges

- The datasets are quite noisy — many factors affecting PnL aren't in the data (like timing, volatility, strategy type).

- Linear models don't capture the complexity of trader behavior, so future work should include more advanced ML models.