Report on Trader Performance and Market Sentiment Analysis

Date: August 8, 2025

1. Executive Summary

This report presents an analysis of the relationship between cryptocurrency trader performance and market sentiment. By integrating historical trader data with a Bitcoin market sentiment index, this study investigates whether specific market emotions—such as "Fear" or "Greed"—are correlated with higher or lower trader profitability. The findings offer actionable insights for developing more informed trading strategies that account for the prevailing market sentiment.

2. Methodology

The analysis was performed using Python with the pandas, matplotlib, and seaborn libraries. The process involved the following key steps:

- **Data Acquisition:** Two primary datasets were utilized:
  - historical_data.csv: A comprehensive log of individual trades, including metrics like Closed PnL, trade Side (Buy/Sell), and a Timestamp IST.
  - fear_greed_index.csv: A daily record of Bitcoin market sentiment, classified into categories such as Extreme Fear, Fear, Neutral, Greed, and Extreme Greed.
- **Data Preprocessing:**
  - The Timestamp IST column in the historical data was converted to a consistent datetime format. A new date column was then created to facilitate the merge.
  - The date column in the sentiment data was also converted to a datetime object.
  - The Closed PnL column was cleaned and converted to a numeric data type, with invalid entries being removed.
- **Data Integration:** The two datasets were merged on the common date column, creating a unified DataFrame that links each trade with the market sentiment on that specific day. An inner join was used to ensure that only trades with a corresponding sentiment classification were included in the analysis.

3. Key Findings

The analysis produced two primary visualizations that highlight the connection between trader performance and market sentiment.

Finding 1: Average PnL by Sentiment Classification

The first analysis calculated the average Closed PnL for all trades across each sentiment classification. This bar chart revealed the overall profitability of traders during different market moods. This visualization helps answer the question of whether a trader is, on average, more profitable when the market is fearful or greedy. The results indicate a clear distribution of average profitability, suggesting that market sentiment plays a significant role in overall performance.

Finding 2: Average PnL by Sentiment and Trade Side

The second analysis provided a more granular view by calculating the average Closed PnL not only by sentiment but also by the trade Side (Buy vs. Sell). This grouped bar chart allows for a deeper understanding of trading behavior. For instance, it can reveal whether "buying the fear" or "selling into greed" is a more profitable strategy on average. The visualization showed distinct performance differences between Buy and Sell trades, depending on the market sentiment classification.

4. Conclusion & Recommendations

The analysis successfully demonstrates a clear relationship between trader performance, as measured by average Closed PnL, and market sentiment. The generated visualizations provide valuable insights that can be used to inform trading strategies.

Recommendations for Further Analysis:

- **Account-Level Performance:** Investigate whether there are specific traders or accounts that consistently outperform the average during certain sentiment periods.
- **Trade Volume and Size:** Analyze the relationship between the volume and size of trades and their profitability under different market conditions.
- **Predictive Modeling:** Develop a machine learning model to predict the probability of a profitable trade based on market sentiment and other trade-specific variables.
- **Leverage Analysis:** Explore how the use of leverage impacts performance across the various sentiment classifications.