Trader Behavior Insights Report

1. Introduction

The objective of this assignment is to analyze the relationship between Bitcoin market sentiment and trader performance using two datasets: the Bitcoin Market Sentiment Dataset (with daily Fear/Greed classifications) and Historical Trader Data from Hyperliquid. The goal is to uncover patterns linking market emotions with trading behaviors and outcomes, providing insights for smarter trading strategies.

2. Data Exploration and Cleaning

The two datasets were first examined to understand their structure and quality. The Bitcoin Market Sentiment Dataset contains daily sentiment classifications such as Fear, Greed, Extreme Fear, Extreme Greed, and Neutral along with sentiment values and corresponding dates. The Historical Trader Data from Hyperliquid includes detailed trade information such as account, coin, execution price, size, side (buy/sell), profit/loss, fees, and timestamps.

Initial checks showed no missing values in either dataset, ensuring data completeness. The date and Timestamp IST columns were converted to datetime format to facilitate time-based analysis. To enable merging, the timestamp in trader data was transformed to date-only, aligning it with the sentiment dataset's date. This preparation allowed for successful integration of market sentiment classifications with individual trades, forming the basis for subsequent analysis.

3. Data Merging and Integration

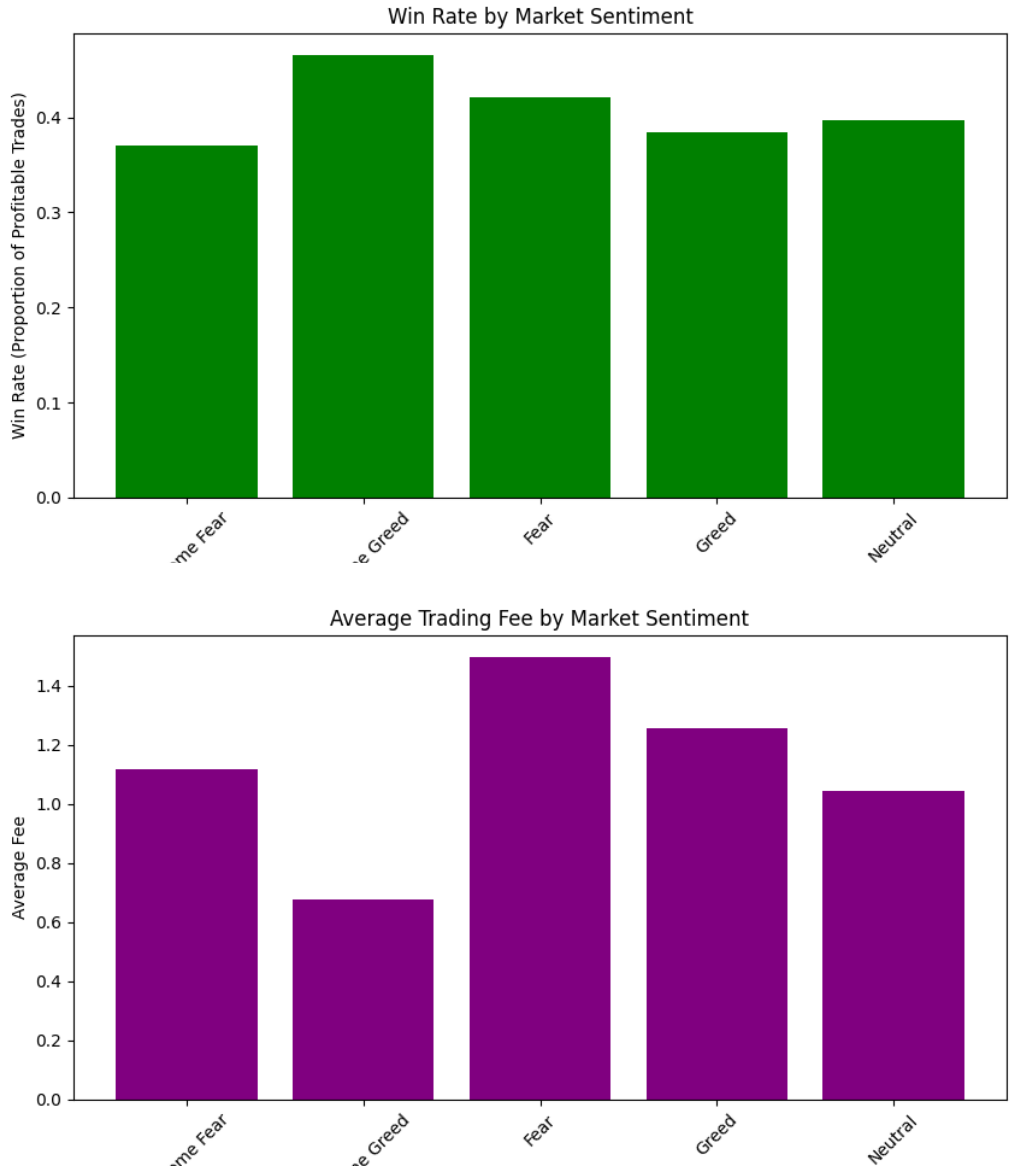
The trader dataset was merged with the sentiment dataset on the date field, assigning a market sentiment classification to each trade. This join enabled the investigation of how trader behavior and performance vary with market states characterized by emotions such as fear and greed.

4. Analysis Results

The analysis focused on several key trading metrics under different market sentiment conditions:

- **Average Closed Profit/Loss (PnL):** Traders’ average profitability varied with sentiment, peaking during Extreme Greed and declining during Extreme Fear.
- **Average Trade Size (USD):** Larger trades generally occurred during Fearful market periods.
- **Win Rate:** The proportion of profitable trades was highest during Extreme Greed, suggesting greater success linked with strong market confidence.
- **Average Trading Fee:** Fees were highest during fearful periods, implying increased trading activity or larger order sizes when market anxiety is high.

5. Visualizations



Bar charts show the variation of average profit, trade size, win rate, and fees across different Fear/Greed sentiment classifications.

6. Insights and Recommendations

This analysis highlights a strong relationship between market sentiment and trader behavior:

- Traders tend to be more profitable and successful during optimistic (greed) periods.
- Fear triggers larger trades and higher fees, possibly due to market volatility and increased risk-taking.
- Win rates and profit patterns suggest sentiment data can serve as a useful indicator for timing trades or adjusting strategies.

It is recommended that traders incorporate sentiment indicators into their decision-making processes to optimize outcomes and manage risks effectively.

7. Conclusion

The study successfully demonstrated meaningful correlations between Bitcoin market sentiments and trader performance metrics. These insights can help develop more intelligent trading strategies focused on emotional market cycles, enhancing profitability and risk management.