Trader Behavior vs Market Sentiment Analysis

1. Introduction

The objective of this analysis is to study how trader behavior changes under different market sentiment conditions, specifically **Fear** and **Greed**.
We analyze historical trading data from Hyperliquid and compare it with the Bitcoin Fear & Greed Index to understand how profitability, trading volume, and trade direction are influenced by overall market sentiment.

2. Datasets Used

2.1 Historical Trader Data

This dataset contains detailed trade-level information, including:

- Execution price
- Trade size (USD)
- Buy/Sell side
- Timestamp (IST)
- Closed Profit and Loss (PnL)

Each trade is timestamped, allowing alignment with market sentiment data.

2.2 Bitcoin Fear & Greed Index

This dataset provides daily market sentiment classified into:

- Fear
- Greed

The sentiment data reflects overall market psychology on a given date.

3. Data Preprocessing

- Converted timestamp columns into proper datetime format.
- Extracted the date from timestamps to enable dataset merging.
- Merged trader data with sentiment data using the date column.
- Removed invalid or null timestamp entries during conversion.

4. Analysis & Key Findings

4.1 Profitability vs Market Sentiment

- The average **Closed PnL** differs noticeably between Fear and Greed phases.
- Trades executed during **Greed** periods generally show higher average profitability.
- Fear periods reflect more conservative outcomes and reduced profit margins.

4.2 Trading Volume vs Market Sentiment

- Average trade size (in USD) is significantly higher during **Greed** periods.
- This indicates increased risk-taking and confidence among traders when market sentiment is positive.
- During Fear phases, traders reduce position sizes to limit exposure.

4.3 Trade Direction Behavior

- Buy/Sell distribution varies across sentiment conditions.
- Greed periods show a higher proportion of aggressive directional trades.
- Fear periods reflect balanced or defensive trade positioning.

5. Limitations

- Leverage information was not available in the historical trader dataset.
- Analysis is limited to the available timeframe and recorded trades.

6. Conclusion

The analysis demonstrates a clear relationship between market sentiment and trader behavior. Greed phases encourage higher risk-taking, larger trade sizes, and increased profitability, while Fear phases result in conservative trading behavior.

Understanding sentiment-driven patterns can help traders design smarter risk-adjusted strategies and improve decision-making during volatile market conditions.

7. Tools & Technologies

- Python
- Pandas
- Matplotlib
- Google Colab