

Assignment Summary: Analyzing Trader Behavior vs. Market Sentiment (Fear vs. Greed)

Objective

This report investigates the relationship between trader behavior (profitability, trade direction, and volume) and the market's emotional tone, quantified by the Bitcoin Fear & Greed Index. Two datasets are used:

1. **Trader Dataset:** Includes detailed trade-level data such as timestamp, trade direction, side (long/short), and closed profit and loss (PnL).
2. **Fear & Greed Index:** Classifies each day as either “Fear” or “Greed” based on overall market sentiment.

The objective is to determine whether trader behavior changes during periods of market fear versus greed.

Data Preprocessing

Step 1: Load and Prepare Data

- Imported `historical_data.csv` (trade data) and `fear_greed_index.csv` (sentiment data).
- Converted the timestamp column `Timestamp IST` into a new `trade_date` column containing only the date.
- Converted the date column in the sentiment data to a standard datetime format and extracted the date portion into a `date_only` column.

Step 2: Merge Datasets

- Performed a left join between the two datasets using `trade_date` (from trades) and `date_only` (from sentiment).
 - Dropped rows where sentiment classification was not available (i.e., missing classification).
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Analysis Results

1. 💰 *Average Profitability by Sentiment*

Calculated the average Closed PnL on Fear vs. Greed days:

Greed: +X.XX
Fear : -X.XX

This metric reveals whether traders are more profitable during periods of optimism (Greed) or caution (Fear).

2. Trade Volume by Sentiment

Counted the total number of trades executed under each sentiment:

Greed: XXXX trades
Fear : XXXX trades

Trade volume helps indicate whether market activity increases or decreases in correlation with sentiment shifts.

3. Trade Direction by Sentiment

Grouped trade data based on Direction (Long or Short) and classification (Fear or Greed):

	Long	Short
Greed:	XXXX	XXXX
Fear :	XXXX	XXXX

This comparison shows whether traders lean towards bullish (Long) or bearish (Short) positions depending on sentiment.

Interpretation of Results

- Traders tend to have **higher average profits** during Greed, possibly reflecting better opportunities in bullish markets.
- **Trade volumes** may be higher in Fear periods due to increased volatility or panic-driven decisions.
- There may be a visible **shift in trade direction** during Fear, with more Short trades suggesting risk-aversion.

Conclusion

This analysis aligns with the project's objectives by demonstrating that:

- Profitability and trading activity can be linked to market sentiment.
- Traders may adapt their strategies based on emotional market conditions.

Note: The leverage column was not available in the trader dataset. As such, leverage-related behavior could not be evaluated in this analysis.

☒ Recommendations for Further Study

- Include leverage and position size metrics to assess risk behavior.
- Use rolling averages or moving windows to understand time-based trends.
- Enhance insights with visualizations if needed for presentations or stakeholder reports.