TRADER ANALYSIS REPORT

Introduction:

This report analyzes a dataset of historical trading activity and a corresponding market sentiment index (Fear & Greed Index). The primary objective is to investigate how different market sentiments—categorized as "Extreme Greed," "Greed," "Neutral," "Fear," and "Extreme Fear"—impact trader behavior, trade size, and overall profitability. By merging these two datasets and performing exploratory data analysis (EDA), we can identify potential correlations and patterns that reveal how traders react to market-wide emotions.

Data Preparation and Cleaning:

The analysis began by loading two separate datasets: historical_data.csv (containing trader activities) and fear_greed_index.csv (containing daily sentiment scores). The following steps were taken to prepare the data for analysis:

- Standardization: Column names in both datasets were standardized to a lowercase, format for consistency.
- Data Type Conversion: The date columns (timestamp_ist and date) were converted to a proper datetime format.
- Data Merging: The two datasets were merged on a common date column. This allowed each trade record to be associated with a specific market sentiment classification for that day.
- Data Cleaning: Missing or invalid date entries were removed to ensure data integrity.
- The merged dataset, containing all relevant trading and sentiment information, was then saved for further analysis.

Exploratory Data Analysis (EDA) & Key Findings

The EDA section used various visualizations to explore the merged dataset. The key findings are summarized below.

Market Sentiment Distribution

The distribution of market sentiment shows that the majority of trading activity occurred on days classified as "Greed" and "Extreme Greed." This suggests that traders were most active during periods of positive market outlook. The other sentiment categories, such as "Fear," "Extreme Fear," and "Neutral," were less common in this dataset.

Average Trade Size by Sentiment

The analysis of average trade size, both in tokens and USD, reveals a clear pattern. The largest trades, on average, were executed during periods of "Extreme Greed." Conversely, the smallest trades occurred during periods of "Extreme Fear." This finding supports the hypothesis that traders are more confident and willing to commit larger capital when the market sentiment is positive.

Profitability (PnL) by Sentiment

A box plot of closed_pnl (Profit and Loss) by sentiment classification reveals the following:

- While there are profitable trades across all sentiment categories, the median PnL for "Greed" and "Extreme Greed" appears to be slightly higher, though the difference is not dramatic.
- More importantly, the distribution of PnL is wider during periods of "Extreme Greed," indicating a higher variance in outcomes. This could mean both the potential for larger gains and larger losses are amplified during these periods.

Correlation Analysis

A correlation heatmap was generated to show the relationships between numerical features. The most notable correlation observed is between size_tokens and size_usd, which is expected since they represent the same trade size in different units. Other features, such as closed_pnl, open_pnl, and the sentiment index, show weak correlations with trade size, suggesting that profitability is influenced by many other factors beyond just the market's general sentiment.

Conclusion

The analysis demonstrates a clear relationship between market sentiment and trading behavior. Traders tend to be more active and execute larger trades during periods of "Greed" and "Extreme Greed." While profitability is not strongly correlated with a specific sentiment, the higher variance in PnL during "Extreme Greed" suggests a more volatile and high-risk, high-reward environment.

Further analysis could involve time-series modeling to predict trader behavior based on sentiment shifts or a more detailed investigation into other factors (e.g., specific assets, time of day) that influence profitability. This report provides a solid foundation for understanding the behavioral aspects of trading in relation to market-wide sentiment.