Trader Behavior vs Market Sentiment – Analysis Report

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Role Applied For: Junior Data Scientist

Objective: To analyze how Bitcoin market sentiment influences trader behavior and performance using Hyperliquid historical trading data.

Datasets Utilized

1. **Bitcoin Market Sentiment Dataset**
    - Columns: date, classification (e.g., Fear, Greed), value (sentiment score)
2. **Hyperliquid Historical Trader Data**
    - Columns: account, coin, execution price, size, side, timestamp, closedPnL, fee, trade ID, and more

Data Preparation Workflow

- Converted Timestamp IST to datetime format and extracted date
- Standardized sentiment dataset's date column for compatibility
- Merged both datasets on date using a left join
- Validated merge success and identified missing values for further handling

Exploratory Data Analysis (EDA)

- Visualized **daily average Closed PnL** to understand performance trends over time
- Created **boxplots** to compare PnL distributions across sentiment classifications
- Calculated **win rate** (trades with positive PnL) for each sentiment category
- Computed sentiment-wise averages for:
    - Closed PnL
    - Size USD
    - Fee

Advanced Analytical Insights

Sentiment Score Bucketing

- Divided sentiment scores into three buckets: Low (0–30), Medium (30–60), High (60–100)
- Observed that the **Medium sentiment zone** corresponds to more balanced trading behavior

Correlation Matrix

- Analyzed relationships between Closed PnL, Fee, Size USD, and Sentiment Score
- Found a **weak negative correlation** between sentiment score and profitability

Time-of-Day Performance

- Grouped hourly performance by sentiment classification
- Identified that **early hours during Fear phases** tend to yield better returns

Coin-wise Sensitivity

- Compared average PnL across coins and sentiment types
- Highlighted coins that are **more reactive to sentiment shifts**, indicating volatility patterns

Trader Consistency Across Sentiments

- Identified top 10 traders with **consistent performance** across all sentiment phases
- These traders may serve as benchmarks for modeling or strategic replication

Key Takeaways

- Traders exhibit **higher risk-taking behavior during Extreme Greed**, but win rate declines
- **Fear and Neutral** sentiment phases are associated with more disciplined and profitable trading
- **Fee impact** is significant — higher fees correlate with lower net PnL
- **Time and sentiment together** influence trading outcomes — strategic timing matters
- Certain traders maintain consistent performance regardless of sentiment — valuable for modeling

Submission Notes

- The notebook includes all essential steps: data loading, cleaning, merging, EDA, advanced analysis, and insights
- Visualizations are created using **matplotlib** and **seaborn**
- This report summarizes the methodology, findings, and strategic implications of the analysis