Data Science Report

Project Title: Trader Behavior Insights – Relationship Between Market Sentiment and Trading Performance

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1. Objective

Analyze how trading behavior (profitability, risk, volume, leverage) aligns or diverges from overall market sentiment (fear vs greed). Identify hidden trends or signals that could influence smarter trading strategies.

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2. Datasets

2.1 Historical Trader Data

- **Source**: Hyperliquid

- **Key Columns**:

    - Account, Coin, Execution Price, Size Tokens, Size USD, Start Position, Closed PnL, Leverage, etc.

- **Purpose**: Analyze trading behavior and profitability.

2.2 Fear & Greed Index

- **Source**: Bitcoin Market Sentiment Dataset

- **Key Columns**:

    - Date, Value, Classification (Fear/Greed)

- **Purpose**: Understand market sentiment trends.

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3. Methodology

3.1 Data Preprocessing

- Merged datasets on the Date column after ensuring consistent formats.

- Handled missing values and ensured data integrity.

3.2 Exploratory Data Analysis (EDA)

- Summary statistics and missing value checks for both datasets.

- Visualized trends in trading behavior and market sentiment.

3.3 Analysis

- **Profitability Trends**:

  o Analyzed Closed PnL over time, segmented by market sentiment (Fear, Greed, etc.).

- **Leverage vs Sentiment**:

  o Boxplot showing leverage distribution across sentiment classifications.

- **Correlation Analysis**:

  o Heatmap of numeric columns to identify relationships between trading metrics.

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4. Key Insights

4.1 Profitability Trends

- **Observation**: Profitability (Closed PnL) tends to increase during periods of Greed compared to Fear.

- **Impact**: Traders may benefit from aligning strategies with greed-driven market sentiment.

4.2 Leverage vs Sentiment

- **Observation**: Higher leverage is observed during Greed periods, indicating riskier trading behavior.

- **Impact**: Risk management strategies should be emphasized during greed-driven sentiment.

4.3 Correlation Analysis

- **Observation**: Strong correlation between Size USD and Fee, indicating larger trades incur higher fees.

- **Impact**: Fee optimization strategies can improve profitability for high-volume traders.

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5. Visual Outputs

5.1 Profitability Trends Over Time

- Line plot showing Closed PnL segmented by sentiment (Fear, Greed, etc.).

5.2 Leverage vs Market Sentiment

- Boxplot showing leverage distribution across sentiment classifications.

5.3 Correlation Matrix

- Heatmap visualizing relationships between numeric trading metrics.

6. Recommendations

1. **Strategy Alignment**:

   o   Align trading strategies with greed-driven sentiment to maximize profitability.

2. **Risk Management**:

   o   Implement stricter leverage controls during greed periods to mitigate risks.

3. **Fee Optimization**:

   o   Focus on reducing fees for high-volume trades to improve overall profitability.

7. Conclusion

This analysis highlights the importance of understanding market sentiment and its impact on trading behavior. By leveraging insights from this study, traders can optimize strategies to align with sentiment trends, manage risks effectively, and improve profitability.

8. References

- Historical Trader Data: Hyperliquid

- Fear & Greed Index: Bitcoin Market Sentiment Dataset