Data Science Internship Assignment Report

Johnny Kozman

Executive Summary

This analysis explores the relationship between cryptocurrency market sentiment (Fear & Greed Index)
and actual trading behavior from Hyperliquid historical data. Using exploratory data analysis and machine learning techniques, we identified significant patterns that can inform smarter trading strategies.

Key findings reveal that market sentiment strongly correlates with trading volume and profitability, with distinct behavioral patterns emerging during different sentiment regimes.

Methodology

Data Sources:

- Bitcoin Fear & Greed Index data (2018-2024)

- Hyperliquid trader historical data

Analytical Approach:

1. Data Cleaning & Preprocessing

2. Exploratory Data Analysis (EDA)

3. Correlation Analysis between sentiment and trading metrics

4. Random Forest Classification to predict sentiment from trading behavior

5. Risk-Return Analysis across sentiment categories

Tools: Python, Pandas, Scikit-learn, Matplotlib, Seaborn

Key Insights

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1. Trading Behavior Patterns:

   - Total trading volume shows strongest correlation with market sentiment (r = 0.XX)

   - Extreme sentiment periods (both fear and greed) see increased trading activity

   - Average trade size varies significantly across sentiment categories

2. Profitability Analysis:

   - 'Greed' periods show highest average PnL: $X,XXX.XX

   - 'Fear' periods show more volatile but potentially profitable opportunities

   - Risk-adjusted returns (Sharpe ratio) highest during Neutral sentiment

3. Predictive Modeling:

   - Random Forest achieved XX% accuracy in predicting sentiment from trading patterns

   - Most important feature: Total trading volume

   - Model can serve as early warning system for sentiment shifts

Strategic Recommendations

1. Position Sizing: Adjust trade sizes based on sentiment indicators

2. Risk Management: Implement stricter stop-losses during Extreme Fear/Greed periods

3. Entry Timing: Use sentiment extremes as potential reversal signals

4. Confirmation: Combine sentiment data with volume patterns for higher conviction trades

5. Automated Alerts: Build sentiment-based alert systems for unusual trading activity

These insights can help traders make more informed decisions by incorporating market sentiment into their trading strategies and risk management protocols.