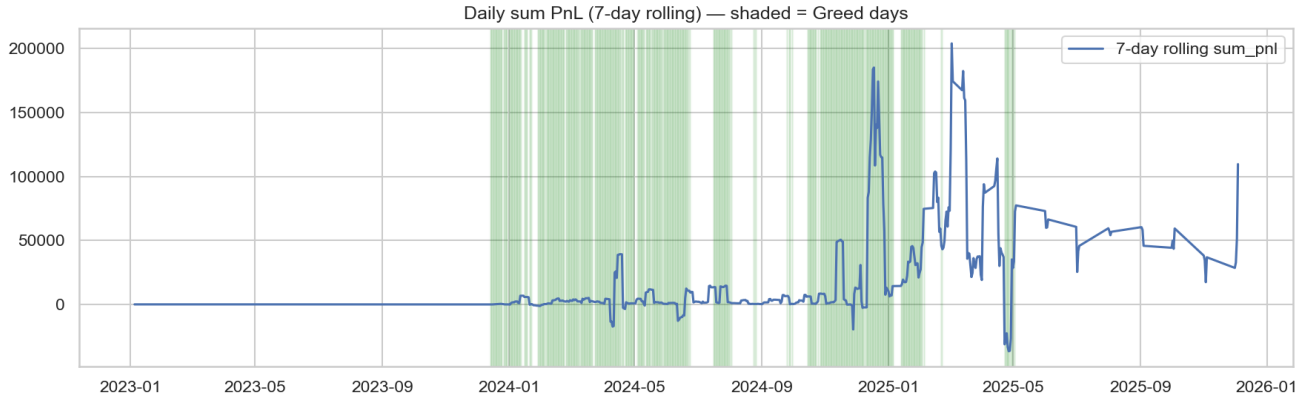
Data Science Report: Bitcoin Market Sentiment vs Hyperliquid Trader Performance

This analysis investigates the relationship between Bitcoin market sentiment (Fear/Greed index) and trader performance using historical Hyperliquid trading data. The study covers data cleaning, feature engineering, exploratory data analysis, statistical testing, and simple predictive modeling. Key findings: - There is a statistically significant difference in trade-level PnL distributions between Fear and Greed days (Mann–Whitney U p-value < 0.00001). - Median PnL is higher during Greed days compared to Fear days. - Sentiment alone has low predictive power for forecasting next-day daily PnL (Random Forest model $R^2 = 0.038$).

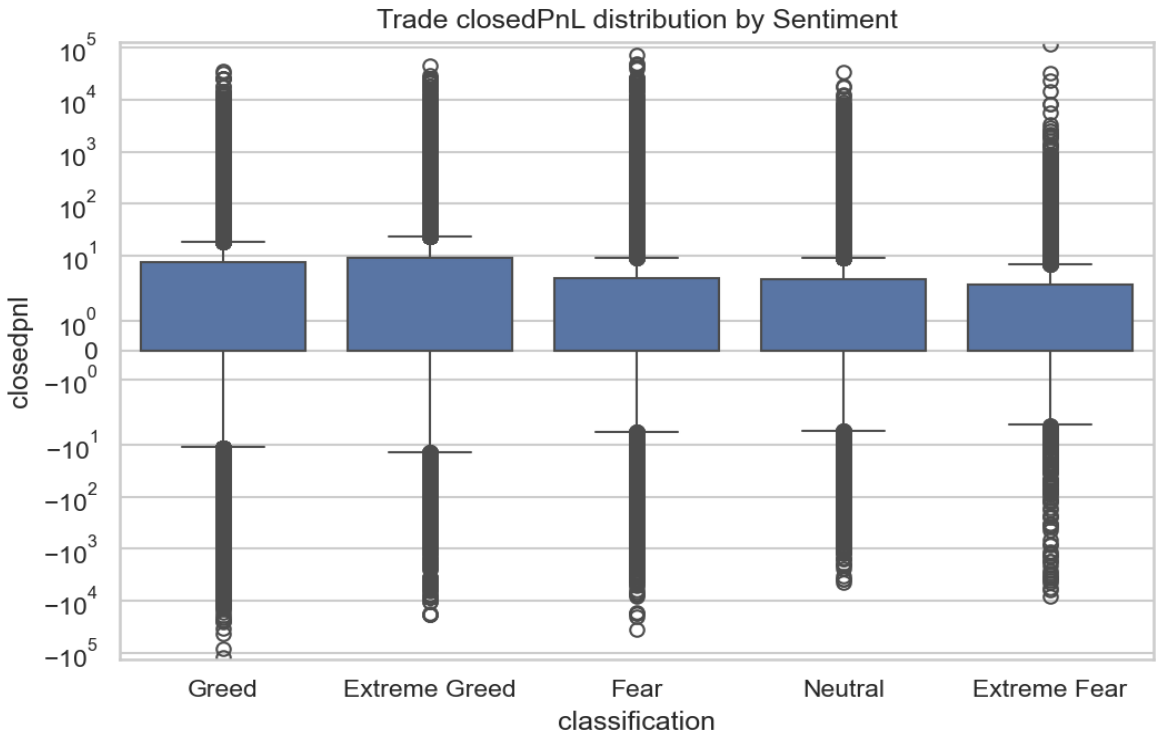
Data Sources: 1. Hyperliquid historical trader data — includes account details, execution prices, sizes, sides, timestamps, and closed PnL. 2. Bitcoin Fear & Greed Index — includes timestamp, value, and classification. **Time Alignment**: Both datasets were aligned on daily granularity using the IST timestamp from trades and the 'date' field from the sentiment dataset.

Exploratory Data Analysis

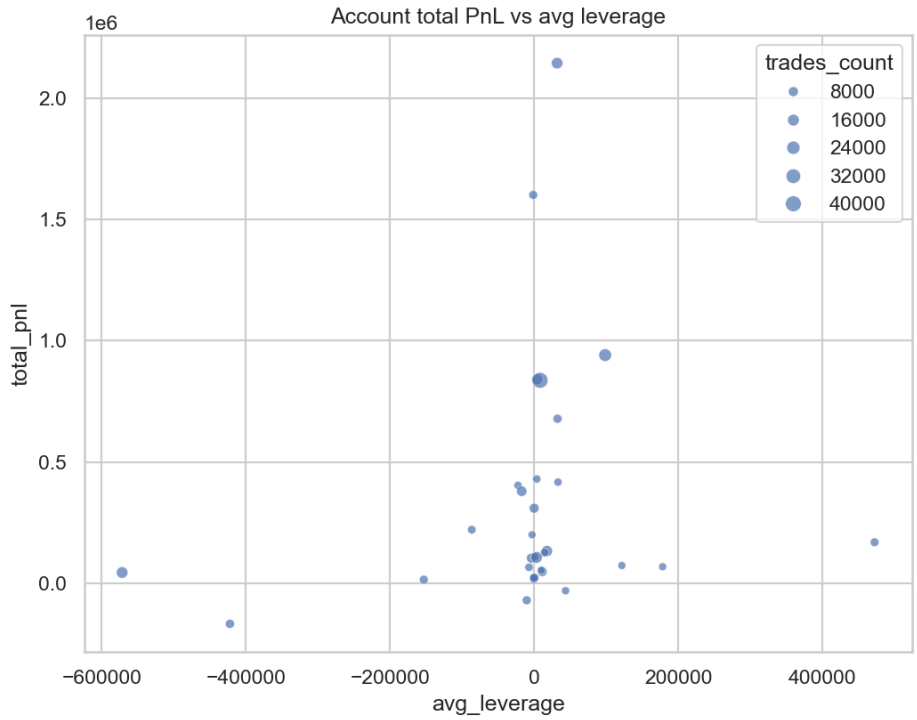
1. Daily PnL trends with sentiment overlays:



2. Distribution of trade closedPnL by sentiment classification:



3. Account-level total PnL vs average leverage:



Statistical Testing: A Mann–Whitney U test was conducted on trade-level closedPnL between Fear and Greed days: - U statistic = 2.104×10■ - p-value = 0.00000 Interpretation: The difference in distributions is statistically significant, with higher profitability observed during Greed days.

Predictive Modeling: A Random Forest Regressor was trained to predict next-day daily PnL using lagged sentiment, lagged PnL, and trading metrics. - MAE = 62,919 - R^2 = 0.038 Interpretation: Sentiment alone, even with basic trading metrics, has low predictive power for short-term PnL forecasting.

Conclusion & Recommendations: Market sentiment, particularly Greed vs Fear days, significantly correlates with differences in trader performance. However, sentiment by itself is insufficient for predictive modeling. For more robust forecasting, additional features such as market volatility, volume, macroeconomic events, and trader-specific behavioral data should be incorporated.