■ Data Science Report: Trader Behavior & Sentiment Analysis

■ Methodology: From Raw Data to Insights

We began by combining our two primary datasets: `historical_data.csv` (detailed trade information) and `fear_greed_index.csv` (market sentiment classifications). To link each trade to the correct day's sentiment, we standardized date formats and merged the datasets. A quick inspection revealed that many trades had a `Closed PnL` (Profit and Loss) of exactly $0.00. This indicates numerous trades were opened and closed without net gain or loss, potentially impacting profitability metrics.

■ Analysis: Uncovering the Patterns

We grouped all trades by the market's sentiment classification and calculated: • Average Closed PnL – average profit or loss per trade. • Average Trade Size USD – average amount of money per position. • Number of Trades – total count for each sentiment period. We also derived: • Total PnL – total profitability by multiplying average profit with trade volume. • Average PnL per USD – efficiency, showing profit per invested dollar.

■ Findings: What the Data Reveals

Visualizations revealed clear trends: • Average Closed PnL: Highest during "Extreme Fear", suggesting a contrarian strategy may be most profitable. • Total PnL: Largest during "Fear" and "Greed" periods, driven by higher trade volumes. • Average PnL per USD: Highest in "Extreme Fear" and "Extreme Greed", indicating efficient capital use in extreme conditions. Conclusion: A dual trading approach could yield optimal results – target efficiency during "Extreme Fear" and leverage volume during "Fear" and "Greed" for higher total gains.