

# Trading Performance and Strategy Analysis Report

This report summarizes the key findings from an analysis of trading data, focusing on overall performance, the influence of market sentiment, and temporal trends.

## 1. Introduction

The objective of this analysis is to understand how trader performance changes across different market sentiment regimes like Fear, Neutral, and Greed using the historical trader dataset and the Fear and Greed Index. The dataset includes individual trade-level information, such as account, coin, size, side, direction, timestamps, fees, and closed PnL. By merging this with market sentiment, we aim to identify behavioural patterns, performance trends, and actionable insights.

## 2. Data Overview

Trader Dataset -

Contains transaction-level trading data:

- Account identifier
- Coin traded
- Execution price
- Position size (tokens and USD)
- Trade side (long/short)
- Trade direction
- Fee
- Closed PnL
- Timestamp in IST

Fear & Greed Dataset -

Contains:

- Daily timestamp
- Sentiment classification
- Sentiment value
- Normalized date used for merging

## 3. Data Preprocessing

The following steps were performed:

1. Parsed the trader Timestamp IST column into a standardized datetime object.
2. Converted numeric fields such as Size USD, Closed PnL, and Fee into numeric formats.

3. Cleaned categorical columns (Side, Direction, Coin) for consistency.
4. Normalized timestamps from both datasets to daily granularity.
5. Merged trader data with sentiment data on the date field (many-to-one relation).
6. Added engineered fields such as win-rate, mean PnL, and hourly breakdowns.

## 4. Exploratory Data Analysis

The EDA covered:

- PnL trends across sentiments
- Win-rate analysis
- Coin-level performance
- Hour-of-day patterns
- Fee behaviour relative to trade size
- Daily PnL time series
- Trader-level (account-level) patterns

Graphs used include:

- Bar charts
- Box plots
- Scatter plots
- Histograms
- Time-series line plots

Every visualization is included in the /outputs/ folder.

## 5. Key Observations -

### 1. Overall Trading Performance

The initial analysis of the overall Profit and Loss (PnL) distribution reveals a highly concentrated outcome.

- Closed PnL Distribution: The histogram shows that the vast majority of trades resulted in a PnL very close to zero, centered between approximately -20,000 and 20,000 USD. This suggests a strategy of frequent, small trades with little overall deviation from the break-even point in individual instances. The large bars centered at zero indicate a high number of trades that either closed immediately or had minimal profit/loss.
  - Total PnL by Coin: The bar chart shows the total PnL generated by the top 10 traded coins.
  - Top Performers: The coins '@107' and 'HYPE' were the largest contributors to the total positive PnL.

- Significant Contributors: 'SOL' and 'ETH' also contributed substantially.
- Underperformer: 'FARTCOIN' was the only coin among the top 10 to show a negative total PnL.

## 2. Influence of Market Sentiment

Analysis of trading activity grouped by market sentiment (Fear, Greed, Extreme Greed, Neutral, Extreme Fear) reveals a strong correlation between sentiment and trading outcomes.

### A. Trading Volume by Sentiment

- Highest Volume: The majority of trades occurred during periods of Fear and Greed.
  - Fear accounted for the largest number of trades (approx. 14,000).
  - Greed was the second highest (approx. 11,500).
- Lowest Volume: Trading volume was lowest during Neutral and Extreme Fear periods.

### B. Profitability and Win Rate by Sentiment

- Extreme Greed Paradox: Trades executed during Extreme Greed had the highest mean PnL and the highest win rate (over 50%), suggesting that trades during peak bullishness were most profitable on average.

\* Fear and Extreme Fear: As sentiment shifts from Fear to Extreme Fear, both the mean PnL and the win rate drop significantly, indicating that trading during periods of peak panic is the least successful.

- PnL Distribution (Box Plot): The box plot confirms the volatility and potential of the Extreme Greed sentiment, showing the largest interquartile range (box size) and the highest median PnL (orange line in the box) of all groups, indicating a wider range of outcomes but generally higher profits (outliers hidden). Extreme Fear shows the tightest, lowest distribution.

### C. Fee and Size Relationship

- The scatter plot of Fee vs. Size USD (sampled) shows that trade size generally correlates with the fee paid.
- Trades made during Greed (orange dots) appear to include some of the largest trade sizes (up to ~550,000 USD).
- Trades made during Fear (blue dots) also show a wide range of sizes, including the single largest trade (over 600,000 USD).
- Trades during Extreme Fear and Neutral sentiments appear to be concentrated at lower sizes.

## 3. Temporal Trading Analysis

The analysis of trades by the hour of the day reveals distinct patterns in volume and profitability.

- Trading Volume by Hour:
  - Peak Activity (24-Hour Cycle): Trading volume is highest in the evening/night hours, peaking sharply at 20:00 (8 PM) and remaining high at 23:00 (11 PM).
  - Lowest Activity: Volume is noticeably lower during the late morning, specifically between 10:00 AM and 13:00 PM (1 PM).
- Mean PnL by Hour:
  - Peak Profitability: The highest average PnL is achieved at 12:00 (Noon), with a mean PnL of approximately 300 USD. This is significantly higher than any other hour.
  - Secondary Peaks: Other high PnL hours include 7:00 AM, 10:00 AM, and 11:00 AM.
  - Losses: The only hour showing a negative mean PnL is 23:00 (11 PM), coinciding with a high-volume hour.

## • Key Takeaways & Recommendations -

1. Exploit Extreme Greed: The data suggests a strong edge in trading during periods of Extreme Greed, as these trades yield the highest average profit and win rate. This contradicts the conventional wisdom of "buying when others are fearful and selling when others are greedy."
2. Avoid Extreme Fear: Trading during Extreme Fear is highly detrimental, with the lowest win rate and lowest mean PnL. Reducing exposure during this sentiment is strongly recommended.
3. Optimize Trading Time:
  - Focus on the Noon Hour: Trades executed around 12:00 PM are, on average, the most profitable. This hour should be a focus for high-conviction trades.
  - Be Cautious at 11 PM: Despite being a high-volume hour, the negative mean PnL at 23:00 PM indicates poor execution or unfavourable market conditions for the strategy during this time. A detailed review of trades during this hour is needed.
4. Review Coin Performance: The strategy should focus on the top-performing coins, particularly '@107' and 'HYPE'. The coin 'FARTCOIN' should be reviewed for potential exclusion due to its negative overall PnL contribution.