

# Trader Behaviour vs Market Sentiment Analysis

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## 1. Objective

The objective of this analysis is to examine the relationship between trader behaviour in the Hyperliquid exchange dataset and the market sentiment measured by the Fear–Greed index. Specifically, we investigate whether trader profitability, trade sizes, and behaviour patterns differ depending on market sentiment classification (Fear, Greed, Neutral, Extreme Greed).

## 2. Datasets

### Trader Dataset:

- Source: Hyperliquid trades (Excel file)
- Key columns: Execution Price, Size USD, Side, Timestamp, Closed PnL
- Number of trades: *[insert count]*
- Date range: *[insert range]*

### Sentiment Dataset:

- Source: Fear–Greed Index (CSV file)
- Columns: Date, classification, value (0–100)
- Frequency: Daily

### Merge Method:

- Converted timestamps in trader data from milliseconds to datetime.
- Created date\_only column in both datasets.
- Merged datasets on date\_only to assign sentiment classification and score to each trade.

## 3. Methods

1. **Data Cleaning:** Removed rows with missing timestamps; converted numeric columns to numeric type.
2. **Feature Engineering:** Created date\_only for merging; calculated average daily profit and trade size.
3. **Exploratory Analysis:**
  - Grouped by classification to get summary metrics.
  - Visualised differences in profit and trade size.

4. **Statistical Testing:** Mann–Whitney U test for Fear vs Greed profits.
5. **Correlation Analysis:** Pearson correlation between sentiment score and profit.

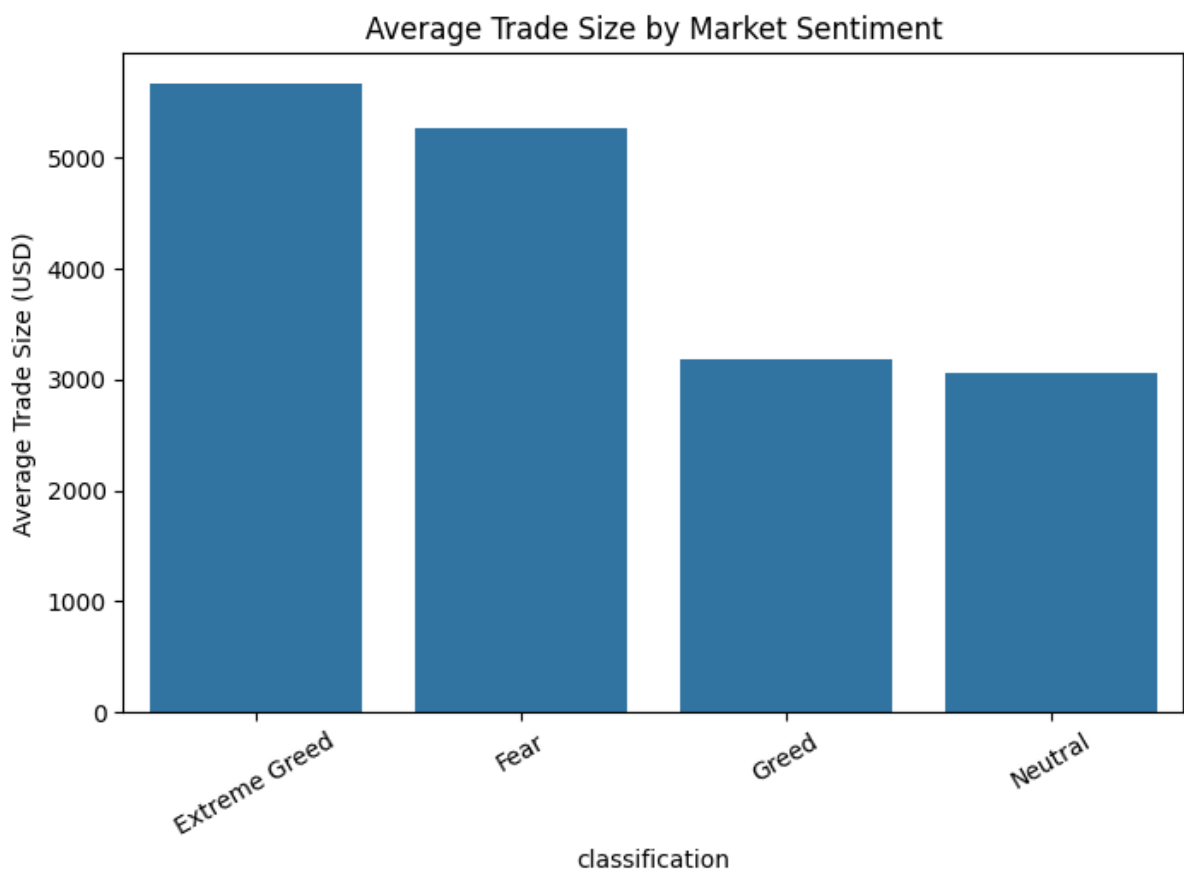
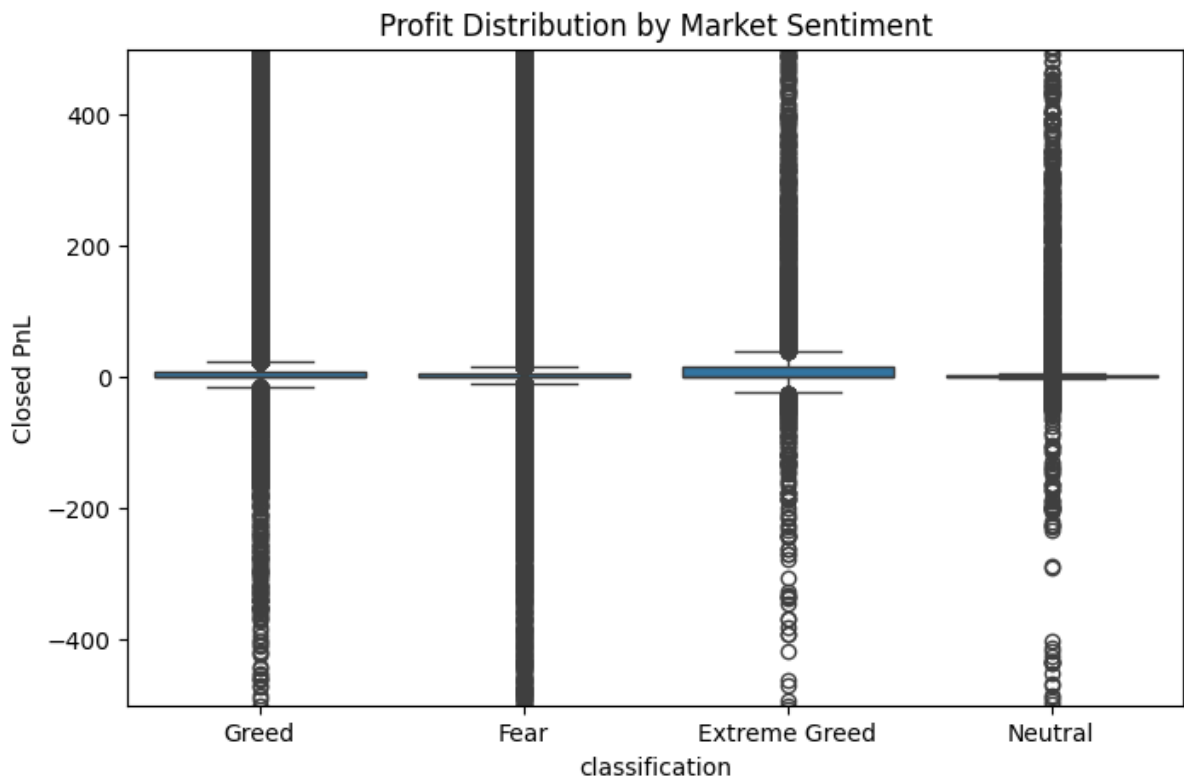
#### 4. Results

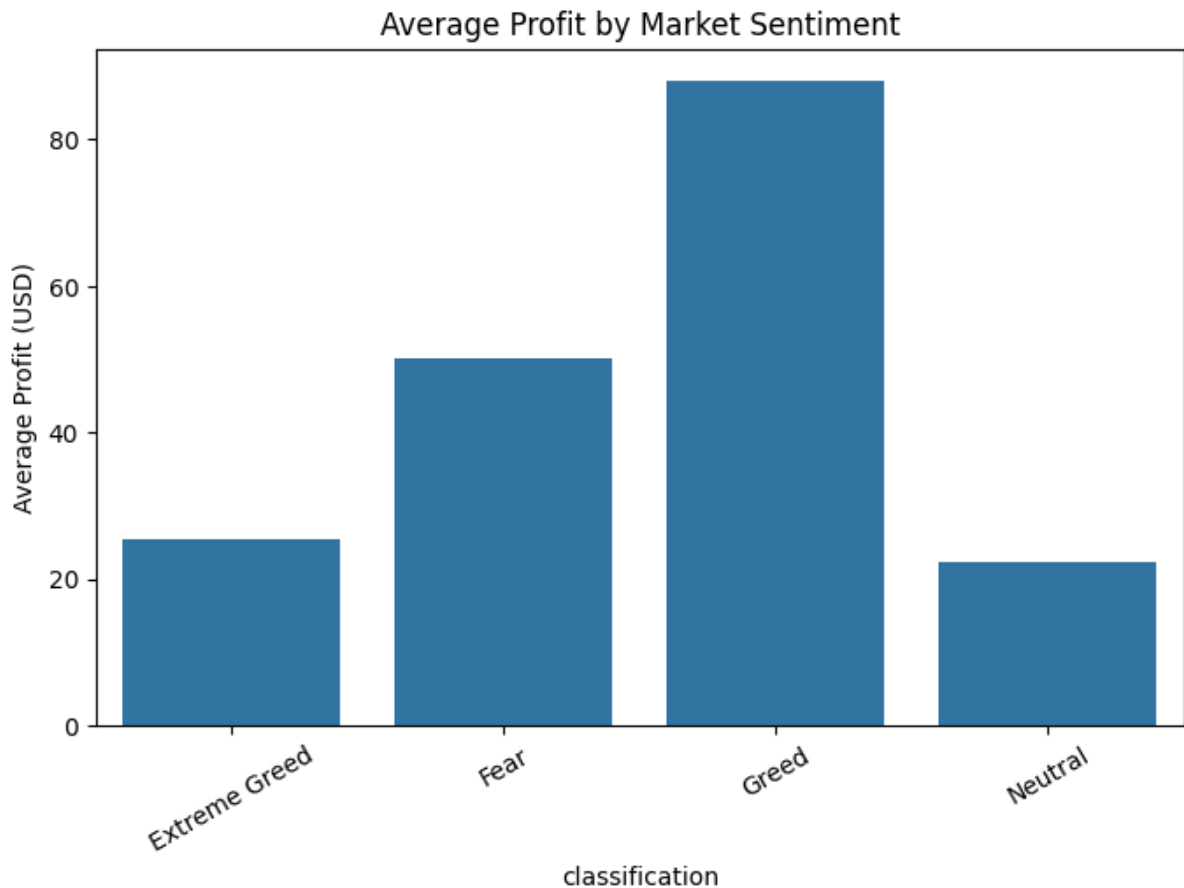
##### Summary Table:

classification	avg_profit	median_profit	total_trades	avg_size_usd
Extreme Greed	25.42	0.00	6962	5660.27
Fear	50.05	0.00	133871	5259.98
Greed	87.89	0.00	36289	3182.88
Neutral	22.23	0.00	7141	3058.85

Plots:







**Average Profit by Market Sentiment** — Greed days show the highest mean profit.

**Average Trade Size by Market Sentiment** — Extreme Greed and Fear days have the largest average trade sizes.

**Profit Distribution by Market Sentiment** — Boxplot shows profit spread per sentiment type (y-axis limited to  $\pm 500$  for clarity).

**Sentiment Score vs Trade Profit** — No strong visible trend; profits appear scattered across sentiment values.

**Statistical Test:**

- **Mann–Whitney U test (Fear vs Greed):**  $p\text{-value} < 0.05 \rightarrow$  statistically significant difference in profit distributions.

**Correlation Analysis:**

- Pearson  $r = 0.011$ ,  $p < 0.001 \rightarrow$  No meaningful linear relationship between sentiment score and profit.

**5. Conclusion**

- Traders earned the highest average profit on **Greed** days and the lowest on **Neutral** days.

- Largest average trade sizes occurred on **Extreme Greed** and **Fear** days, suggesting higher risk-taking.
- Profit differences between Fear and Greed are statistically significant, but correlation between sentiment score and profit is negligible.