

# Fear–Greed Sentiment Trading Analysis Data Science Case Study Report Author: Shruti Adsul

## 1. Introduction

Financial markets are heavily influenced by human emotions, and two of the strongest emotions in trading are Fear and Greed. This project aims to analyze how crypto traders behave under different market sentiment conditions by combining:

- Real trading dataset (trade sizes, PnL, timestamps, directions) - A Fear–Greed sentiment dataset (daily sentiment values)

The goal is to understand whether trader performance and behavior shift meaningfully depending on whether the market is fearful or greedy.

This analysis is important for understanding risk, trading patterns, and how psychology impacts financial decision-making.

## 2. Dataset Overview and Cleaning Process

Two datasets were used:

1. Hyperliquid Trading Dataset Includes: size\_usd, size\_tokens, execution\_price, closed\_pnl, direction, side, timestamp\_ist, account.

2. Fear–Greed Sentiment Dataset Contains daily market sentiment labels.

Cleaning steps: - Converted timestamps to datetime - Extracted date column - Standardized column names - Removed invalid or missing values - Ensured correct numeric types - Merged trading and sentiment data - Created final sentiment column

## 3. Exploratory Data Analysis (EDA)

Key observations: - Larger trade sizes during Greed - Higher market participation in Greed - PnL varies noticeably between sentiment states - PnL distribution is skewed - Win rates show differences across sentiment

Visualizations created: Daily PnL, daily volume, avg PnL by sentiment, avg size by sentiment, win rate, PnL distribution.

## 4. Statistical Testing

Mann-Whitney U Test was used due to non-normal data distribution. Metrics tested: - Closed PnL - Trade size (USD)

Interpretation:  $p < 0.05$  indicates significant differences between Fear and Greed.

## 5. Feature Engineering

Created features per account per day: - Number of trades - Total volume (USD & tokens) - Average PnL - Win rate

Useful for ML and trader behavior modeling.

## 6. Findings & Insights

- Higher risk-taking during Greed - Volume increases in Greed periods - PnL behavior shifts with sentiment - Sentiment strongly influences trader decisions

## 7. Limitations

- No leverage data - Sentiment is general, not coin-specific - Missing dates for some accounts - No demographic or portfolio history

## 8. Conclusion

Fear and greed significantly impact trader behavior. Combining sentiment data with real trades uncovers meaningful psychological and behavioral patterns.

End of Report