

# Trader Behavior Analysis Based on Market Sentiment

## Introduction

This project analyzes trader behavior by combining historical trading data with the Bitcoin Fear & Greed Index to study how market sentiment affects profitability, win rate, and risk-taking behavior.

## Datasets Used

- Trader historical trade data (PnL, trade size, timestamps)
- Bitcoin Fear & Greed Index (Fear, Neutral, Greed, Extreme Greed)

## Methodology

- Converted timestamps to a uniform datetime format
- Extracted daily trade dates
- Merged trader data with daily sentiment data
- Performed statistical analysis and visualization

## Key Findings

- Traders are most profitable during Greed periods
- Win rates peak during Extreme Greed
- Neutral sentiment shows the weakest performance
- Median PnL is zero, indicating skewed profit distribution

## Visual Analysis

### Figure 1: Average Profit/Loss by Market Sentiment

The bar chart shows that average trader profitability is highest during Greed periods, followed by Fear. This indicates that traders tend to benefit from strong market emotions, particularly during optimistic phases. In contrast, Neutral sentiment periods show the lowest average profitability, suggesting limited trading opportunities when market direction is unclear.

### Figure 2: Win Rate by Market Sentiment

This visualization highlights that Extreme Greed periods have the highest win rate, followed by Greed. This suggests increased confidence and decisive trading behavior during bullish market conditions. Neutral sentiment phases have the lowest win rate, indicating inconsistent outcomes when traders lack clear market signals.

### Figure 3: Average Trade Size (USD) by Market Sentiment

The chart demonstrates that traders take the largest positions during Extreme Greed and Fear periods, reflecting higher risk-taking during emotionally driven markets. Smaller trade sizes during Neutral sentiment indicate cautious behavior and reduced market participation.

**Conclusion**

Market sentiment significantly influences trader performance and risk appetite. Emotion-driven market phases lead to higher trade sizes and profitability, while neutral conditions result in lower engagement and weaker outcomes.