Analysis of Trader Performance vs Bitcoin Market Sentiment

Submitted by:

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Role: Data Science Assignment – Web3 Trading Team

Tools Used: Python, Google Colab, Pandas, Matplotlib

Introduction

This project analyzes the relationship between trader performance and Bitcoin market sentiment using historical trading data and the Fear & Greed Index. Market sentiment reflects the emotional state of traders, which often influences trading decisions. The goal of this analysis is to understand how profitability and risk-taking behavior change during Fear and Greed market conditions and to derive insights that can support smarter trading strategies.

Objective

The objective of this project is to explore how trader performance and behavior vary under different market sentiment conditions and to uncover patterns that can inform better risk management and trading decisions.

Datasets used:

1. Historical Trader Data:
   This dataset contains trade-level information including timestamps, profit and loss (PnL), leverage, and trading activity.
2. Bitcoin Fear & Greed Index:
   This dataset provides daily market sentiment classified as Fear or Greed, representing overall market psychology.

Methodology

Collected two datasets: historical trader data and the Bitcoin Fear & Greed Index.

Performed all analysis using Python in Google Colab.

Converted Unix timestamps from the trade dataset into datetime format and extracted date values.

Cleaned the data by handling invalid timestamps and identifying missing sentiment values.

Merged the trade data with the sentiment dataset using the date column.

Removed trades without matching market sentiment from the final analysis.

Conducted exploratory data analysis to compare profit/loss, leverage usage, and trading activity during Fear and Greed periods.

Created visualizations to highlight differences in trader behavior across market sentiment conditions.

Interpreted observed patterns to derive insights that support smarter trading strategies.
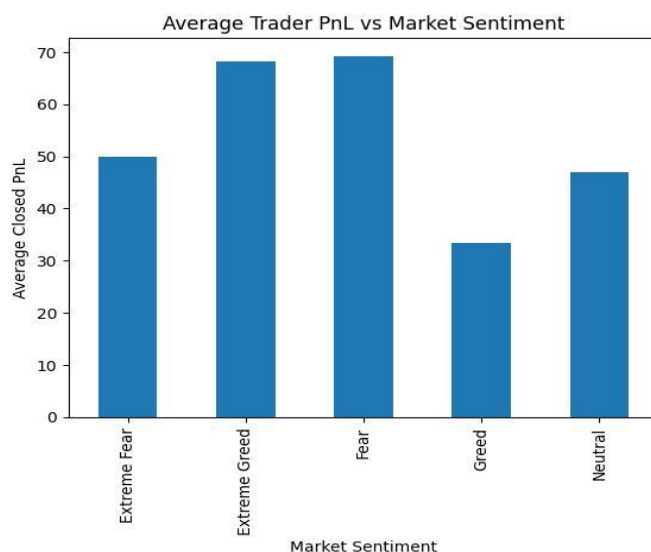
Analysis & Visualizations

Fig 1: Average PnL during Fear vs Greed

This figure compares average closed PnL i.e profit and loss under Fear and Greed market conditions.

Highlights how market sentiment directly impacts trader performance and profitability.
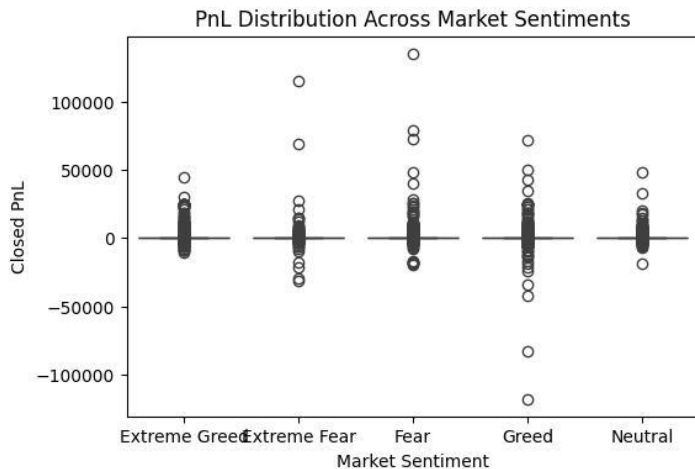
Fig 2: PnL Distribution Across Market Sentiments

This plot shows the distribution of trader profit and loss across different market sentiment categories. It highlights that Greed and Extreme Greed periods exhibit higher volatility, with both large gains and significant losses compared to Fear-driven markets.
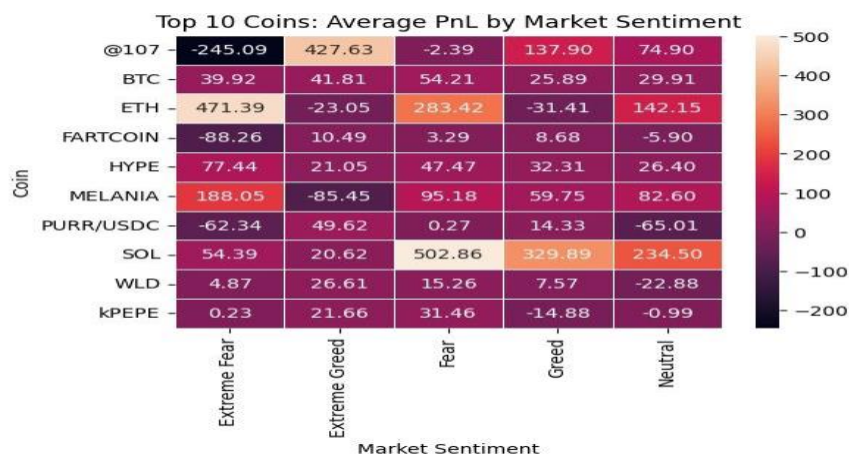

Fig 3: Top 10 Coins – Average PnL by Market Sentiment

This heatmap illustrates how average trader profitability for the top 10 traded coins varies across market sentiment conditions. It shows that certain coins perform better during specific sentiment phases, indicating that asset-wise performance is influenced by overall market psychology.

This analysis was done on google colab :

https://colab.research.google.com/drive/1s_8WjHoxgU8aBlQt9eKStRz1EJOvOJWg

Conclusion

This project demonstrates that market sentiment has a clear influence on trader behavior and performance in cryptocurrency markets. The analysis shows that Greed and Extreme Greed phases are associated with higher volatility, increased leverage usage, and larger profit and loss fluctuations, while Fear-driven periods tend to reflect more cautious and disciplined trading behavior. Additionally, coin-level analysis indicates that different assets respond differently to sentiment changes, emphasizing the importance of asset-specific strategies.

The insights derived from this study highlight how understanding market psychology can support smarter trading decisions and improved risk management. By combining historical trading data with sentiment indicators, traders and analysts can better anticipate periods of increased risk and adjust strategies accordingly.

Tools Used: This analysis was conducted using Python in Google Colab, with libraries such as Pandas and NumPy for data processing and Matplotlib for visualization. Google Drive was used for dataset management and result storage.