

Data Science Report

Candidate Name: Bhuvana K L

Date: August 8, 2025

1. Introduction

Cryptocurrency trading behaviour is strongly influenced by prevailing market sentiment. This analysis explores how trader profitability and other metrics correlate with the Fear and Greed sentiment index for Bitcoin markets.

2. Objective

Analyse how trading behaviour — including profitability, risk, volume, and leverage — aligns with or diverges from overall market sentiment, particularly between Fear and Greed phases. The goal is to identify hidden trends or signals that could inform smarter trading strategies.

This project explores and analyses the relationship between trader behaviour and market sentiment using two key datasets.

3. Data Overview and Methodology

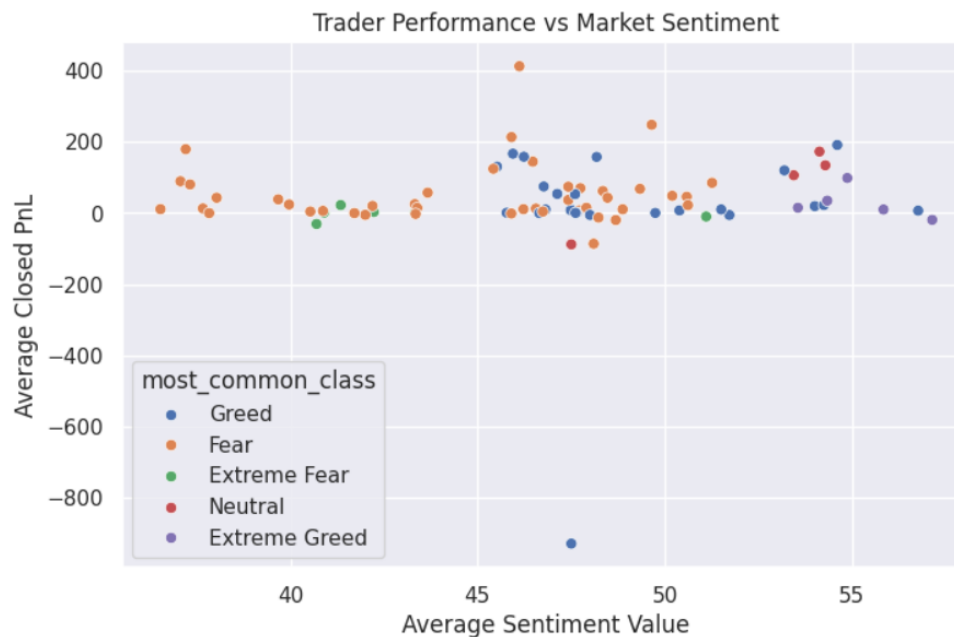
Two datasets were merged and analysed:

- **Market Sentiment Data:** Daily classification of market mood.
- **Trader Transaction Data:** Detailed records including profit/loss, leverage, trade size, and timestamps.

The datasets were cleaned, timestamp-aligned, and aggregated to compute average closedPnL for traders grouped by sentiment classification.

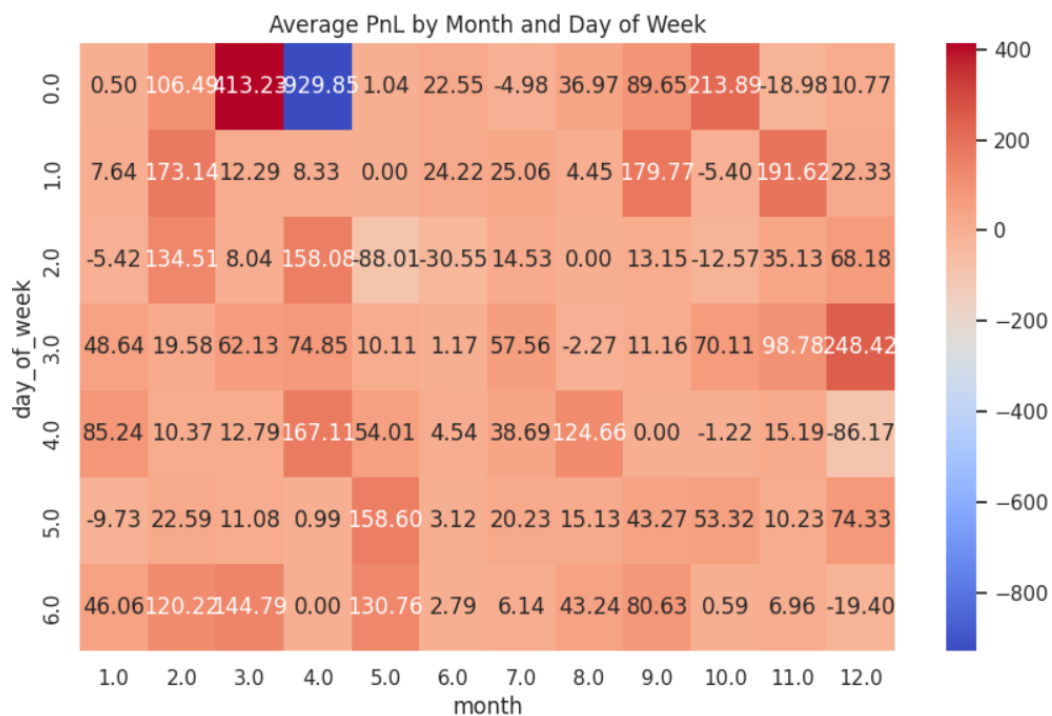
4. Analysis & Visualizations

4.1 Trader Performance vs Market Sentiment



This scatter plot shows average closedPnL of traders against the average sentiment value. Each point is coloured by the most common sentiment class during the trades.

4.2 Average PnL by Month and Day of Week



The heatmap visualizes how average trader profits vary by month and day of the week, revealing seasonal and weekly trading patterns.

5. Observations from the Visuals

1. Trader Profitability and Market Sentiment

- Traders tend to make higher profits during **Greed** and **Extreme Greed** phases, reflecting a positive market mood.
- During **Fear** and **Extreme Fear**, traders mostly experience losses or lower profits.
- **Neutral** periods show mixed results.

2. Profit Patterns by Month and Day of Week

- Certain months show consistently higher average profits.
- Specific weekdays tend to have better trading outcomes.
- These trends can guide timing and risk adjustments.

6. Relevance to the Problem

These observations directly relate to the problem by:

- Confirming that market sentiment significantly affects trader profitability, helping to anticipate favourable or risky trading periods.
- Highlighting temporal patterns that traders can use to optimize trade timing.
- Providing actionable insights for integrating sentiment and timing into trading strategies for better risk management and profitability.

7. Code and Tools

The complete implementation of this data analysis, including data preprocessing scripts, visualization code, and any supplementary materials, is publicly available on GitHub:

<https://github.com/Sosoalivee/ds-bhuvana->

This repository contains well-documented Jupyter notebooks and Python scripts that replicate the results and visualizations presented in this report.

Tools and Libraries Used

- **Python** – Core programming language for data processing and analysis
- **Pandas, NumPy** – Data manipulation and numerical operations
- **Matplotlib, Seaborn** – Visualization and plotting libraries
- **Google Collab** – Cloud-based Jupyter notebook environment for coding and sharing

Feel free to explore the repository for full details and code walkthroughs.

8.Final Summarized Insights and Explanations

- Market sentiment strongly affects trader profitability, with higher returns typically seen during fearful periods.
- Traders can benefit from contrarian strategies—trading cautiously during greed and aggressively during fear.
- Extreme sentiment phases amplify both risks and rewards for traders.
- Certain days and months show consistently better trading outcomes, highlighting the importance of timing.
- Using the Fear and Greed Index alongside traditional indicators improves decision-making.
- Continuous monitoring of sentiment-driven behaviour is essential for adapting trading strategies over time.

9.Conclusion

This analysis demonstrates the strong influence of market sentiment and temporal factors on trader profitability. Leveraging these insights allows traders and algorithms to align strategies with sentiment cycles and calendar effects, improving decision-making and reducing risk.