Final Report: Data Science Case Study

Project: Trading Behavior vs Market Sentiment
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Notebook Link: Open in Colab
GitHub: Open in Github

- **Objective**

This analysis explores the relationship between trader behavior and market sentiment ("Fear" vs "Greed") in the cryptocurrency market. The aim is to identify how trading patterns such as PnL, leverage, and trade size change in response to sentiment shifts.

- **Datasets Used**

1. Bitcoin Market Sentiment Dataset
    - Source: Fear & Greed Index
    - Columns: Date, Classification (Fear / Greed)
2. Historical Trader Data (Hyperliquid)
    - Fields: Execution Price, Size USD, Start Position, Closed PnL, Timestamp IST, etc.

- **Methodology**
    - Converted Timestamp IST to proper datetime format (%d-%m-%Y %H:%M)
    - Extracted date and merged both datasets on Date
    - Cleaned and grouped data by Classification (sentiment)
    - Calculated:
        - Average Closed PnL
        - Average Size USD
        - Average Start Position (Leverage)
    - Created visual comparisons using Seaborn bar plots

- **Insights Summary**

Sentiment	Avg PnL (Closed)	Avg Trade Size (USD)	Avg Leverage
Greed	↑ Higher	↑ Larger	↑ Higher
Fear	↓ Lower	↓ Smaller	↓ Lower

- **Key Observation:**
  Traders show more aggressive behavior during "Greed" days — with higher leverage, larger trades, and better PnL. In contrast, sentiment classified as "Fear" corresponds to lower engagement and risk-taking.

- **Visual Output (in /outputs/)**
  - avg_pnl_by_sentiment.png – Avg PnL by Sentiment
  - avg_trade_size_by_sentiment.png – Avg Trade Size by Sentiment
  - avg_leverage_by_sentiment.png – Avg Leverage by Sentiment

These visuals clearly show upward trends for all metrics under "Greed".

- **Tech Stack**

Python, Pandas, Matplotlib, Seaborn

Google Colab (Notebook link above)

GitHub (Pending push)

- **Conclusion**

This analysis highlights behavioural shifts among crypto traders based on market sentiment. "Greed" prompts higher risk and better outcomes, while "Fear" causes reduced participation and lower performance.

Understanding these patterns can support the development of algorithmic strategies that adapt based on real-time sentiment indicators.

How to Run

- Open the notebook using the shared Colab link
- Upload the provided CSVs
- Run all cells to reproduce analysis and visualizations