**Trading Behavior and Market Sentiment Analysis**

**Project Overview**

This project analyzes the relationship between cryptocurrency trading behavior and market sentiment using Fear & Greed Index data combined with historical trading records from Hyperliquid exchange.

**Assignment Context**

**Web3 Trading Team - Data Science Assignment**

The objective is to explore and analyze the relationship between trader behavior and market sentiment using two key datasets to identify hidden trends or signals that could influence smarter trading strategies.

**Repository Structure**

ds\_<candidate\_name>/

├── notebook\_1.ipynb # Main analysis notebook (Google Colab)

├── csv\_files/ # Store all CSVs or data outputs

│ ├── fear\_greed\_index.csv # Bitcoin Market Sentiment Dataset

│ └── historical\_data.csv # Historical Trader Data from Hyperliquid

├── outputs/ # Store all visual outputs, graphs, charts

│ ├── avg\_size\_by\_sentiment.png

│ ├── pnl\_boxplot\_by\_sentiment.png

│ └── daily\_pnl\_vs\_sentiment.png

├── ds\_report.pdf # Final summarized insights and explanations

└── README.md # Setup instructions and notes

**Key Findings**

**Trading Performance by Sentiment**

* **Greed periods**: Highest profitability (87.89 USD mean PnL) with smallest trade sizes
* **Neutral periods**: Moderate profitability (48.64 USD mean PnL)
* **Extreme Greed periods**: Lowest profitability (25.42 USD mean PnL) with largest trade sizes

**Strategic Insights**

1. Moderate greed periods offer optimal risk-adjusted returns
2. Extreme sentiment conditions reduce profitability
3. Counter-intuitive relationship: higher sentiment ≠ better performance

**Dataset Information**

**1. Bitcoin Market Sentiment Dataset**

* **Source**: Fear & Greed Index
* **Columns**: Date, Classification (Fear/Greed), Value
* **Time Range**: 2018-2025

**2. Historical Trading Data**

* **Source**: Hyperliquid Exchange
* **Key Columns**: Account, Symbol, Execution Price, Size, Side, Timestamp, Closed PnL, etc.
* **Records**: 211,224 trades
* **Time Range**: October 2024 onwards

**Technical Implementation**

**Technologies Used**

* **Python**: Data analysis and processing
* **Pandas**: Data manipulation and merging
* **Matplotlib/Seaborn**: Data visualization
* **Google Colab**: Development environment

**Key Processing Steps**

1. Data cleaning and standardization
2. Timestamp conversion and timezone handling
3. Dataset merging with forward-fill for missing values
4. Feature engineering (temporal features, sentiment mapping)
5. Statistical analysis and visualization

**Visualizations Generated**

1. **Average Trade Size by Sentiment**: Bar chart showing position sizing patterns
2. **PnL Distribution by Sentiment**: Box plots revealing profitability distributions
3. **Daily PnL vs Average Sentiment**: Time series correlation analysis

**Setup Instructions**

**Prerequisites**

* Google Colab account
* Access to provided datasets

**Running the Analysis**

1. Open notebook\_1.ipynb in Google Colab
2. Mount Google Drive and ensure datasets are in correct paths
3. Run all cells to reproduce the analysis
4. Generated visualizations will be saved to /outputs/ directory

**Data Access**

* Historical Trader Data: [Google Drive Link]
* Fear & Greed Index: [Google Drive Link]

**Results Summary**

The analysis of 211,224 trading transactions reveals that **moderate market greed provides the most profitable trading conditions**, while extreme sentiment periods (both positive and negative) tend to reduce overall profitability. This counter-intuitive finding suggests that balanced market psychology creates optimal trading environments.

**Future Enhancements**

* Multi-exchange analysis expansion
* Real-time sentiment integration
* Machine learning predictive models
* Extended historical data coverage

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