

Title:

## Data Science Assignment Report — Trader Behavior vs Market Sentiment

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### 1. Overview

This report analyzes the relationship between trader activity and crypto market sentiment (Fear vs Greed). Using Hyperliquid trading data and the Bitcoin Fear & Greed Index, we study how leverage, PnL, trade volume, and position direction change with emotions in the market.

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### 2. Datasets Used

#### (a) Fear & Greed Index

- Columns: Date, Classification (Fear/Greed)

#### (b) Hyperliquid Historical Trader Data

- Fields include: account, symbol, execution price, side, size, closed PnL, leverage, timestamp, etc.
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### 3. Data Cleaning & Preprocessing

- Converted timestamps to datetime
  - Removed null/invalid values
  - Standardized column names
  - Aggregated daily metrics:
    - Daily PnL
    - Daily Volume
    - Average Leverage
    - Win/Loss Ratio
  - Merged with sentiment dataset on date
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### 4. Exploratory Data Analysis

Explorations included:

- Daily PnL Trend
- Total USD Volume on Fear vs Greed days
- Leverage comparison across sentiment
- Long/Short positioning shifts
- Profitability comparison

Graphs were saved in `outputs/` folder.

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## 5. Insights

- Greed days show higher leverage and more aggressive trading
  - Fear days show lower volatility and more stable profitability
  - Long positions dominate Greed periods
  - Short positions increase during Fear
  - Extreme sentiment changes can predict profit spikes
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## 6. Conclusion

Market sentiment significantly influences trader behavior. Understanding these patterns can improve risk management and predictive trading strategies.

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## 7. Included Files

- `notebook_1.ipynb`
- `csv_files/`
- `outputs/`
- `ds_report.pdf`