

**Trader Behavior Insights**  
**Junior Data Scientist Assignment**  
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## 1. Objective

The goal of this analysis is to explore the relationship between **trader performance** and **market sentiment** (Fear/Greed Index). By combining historical trading data with sentiment data, we aim to uncover hidden patterns that can inform smarter trading strategies.

## 2. Data Sources

- **Historical Trader Data (Hyperliquid)** – 211,224 trades with details such as account, coin, execution price, trade size, side, closed PnL, and fees.
- **Fear & Greed Index** – 2,644 daily records of market sentiment (Fear, Greed, etc.) from 2018 to 2025.

Both datasets were merged on trade dates to align trades with the sentiment of that day.

## 3. Methodology

### 1. Data Cleaning

- Converted timestamps to datetime.
- Standardized numeric columns (PnL, trade size, execution price, fee).
- Cleaned categorical columns (Side, Coin, Account).

### 2. Merging

- Matched trades with sentiment labels by date.
- Final merged dataset: ~35,864 trades (2023–2025 period with valid sentiment).

### 3. Exploratory Data Analysis

- Compared average PnL, win rate, and trade counts across sentiments.

- Analyzed performance differences by **Side (Long/Short)**.
- Evaluated **coin-level performance** under different sentiments.

#### 4. Visualization

- Bar charts for average PnL, win rates, and number of trades by sentiment.

#### 5. Predictive Modeling (Optional)

- Built a baseline logistic regression model to predict profitable trades using sentiment and trade features.

### 4. Key Insights

- Traders had a **higher win rate in GREED** periods compared to FEAR.
- **Long trades** were more profitable during GREED, while **short trades** were safer in FEAR.
- Certain coins (e.g., BTC, ETH) showed more stable performance across sentiments, while altcoins were riskier.
- The baseline predictive model achieved ~57% accuracy, suggesting sentiment adds modest predictive power.

### 5. Conclusion

- Market sentiment significantly affects trader performance.
- Strategies should adapt: take advantage of GREED periods for long trades, and focus on risk management during FEAR.
- Future improvements include:
  - Adding volatility/return features.
  - Using advanced ML models (Random Forest, XGBoost).
  - Account-level analysis to identify consistently profitable traders.

## 6. Deliverables

- **notebook\_1.ipynb** – full analysis with code
- **csv\_files/** – datasets (original + merged)
- **outputs/** – plots and graphs
- **ds\_report.pdf** – this summary report