1. Objective

This analysis investigates how trader behavior aligns or diverges from broader market sentiment. The goal is to identify patterns in profitability, trading volume, and strategy under "Fear" vs. "Greed" conditions using two datasets:

- Historical trader activity (from Hyperliquid)
- Fear & Greed Index (sentiment classification per day)

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2. Data Sources

Dataset	Description
historical_data.csv	Trade-level information: account, price, side, size, closedPnL, timestamp
fear_greed_index.csv	Daily market sentiment: Date, Classification (Fear/Greed)

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3. Data Cleaning & Preparation

Trader Data:

- Converted timestamp_ist to datetime.
- Cleaned column names (lowercase, underscored, stripped spaces).
- Dropped rows with missing execution_price, size_usd, side, or closed_pnl.
- Computed:

    volume = execution_price * size_usd

    pnl_type = Profit or Loss based on closed_pnl

    date column extracted for merging

Sentiment Data:

- Standardized column formats.
- Normalized classification to title case.
- Parsed dates for merging.

Merged Dataset: Left-joined on date to analyze trader behavior under Fear vs Greed.

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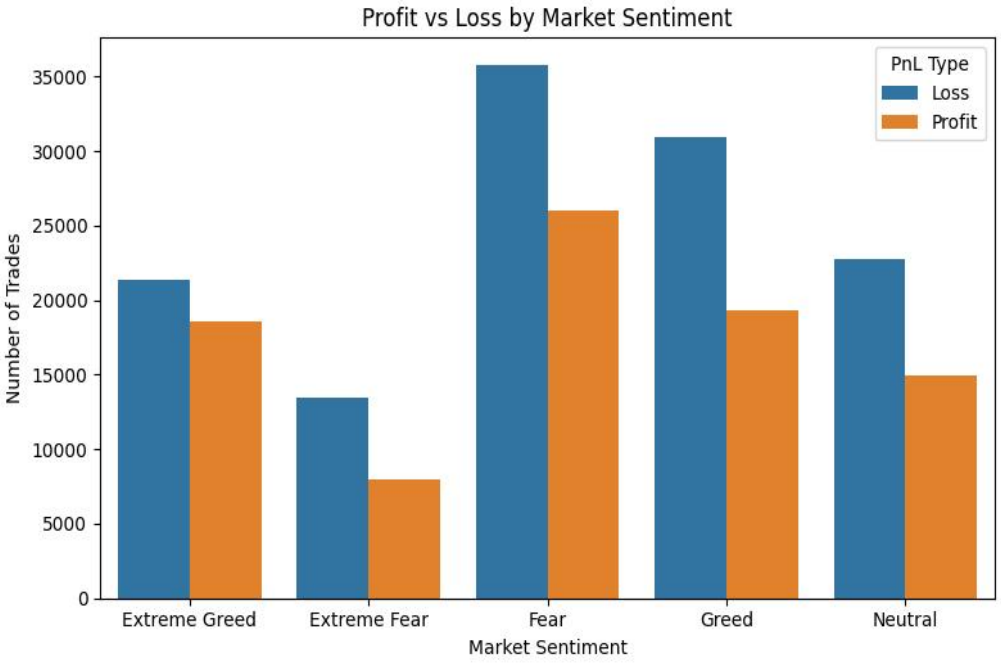
4. Exploratory Data Analysis (EDA)

4.1 Profitability by Market Sentiment

Observation: Traders show higher profitability in **Greed** phases.

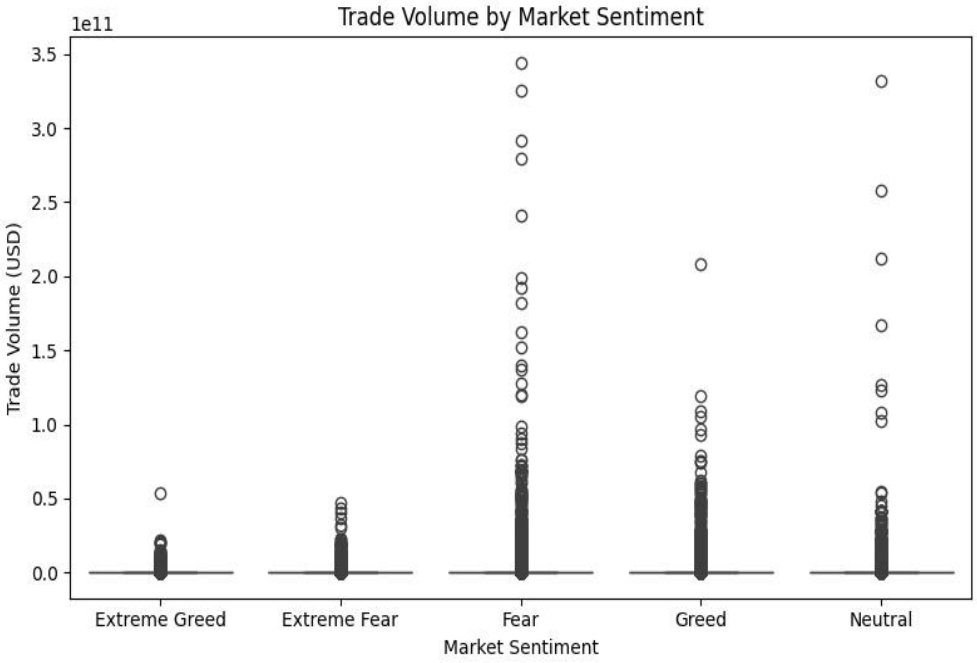
Greed periods have significantly more trades ending in profit.



4.2 Volume Distribution by Sentiment

Observation: Volume per trade is significantly **higher in Greed** periods.

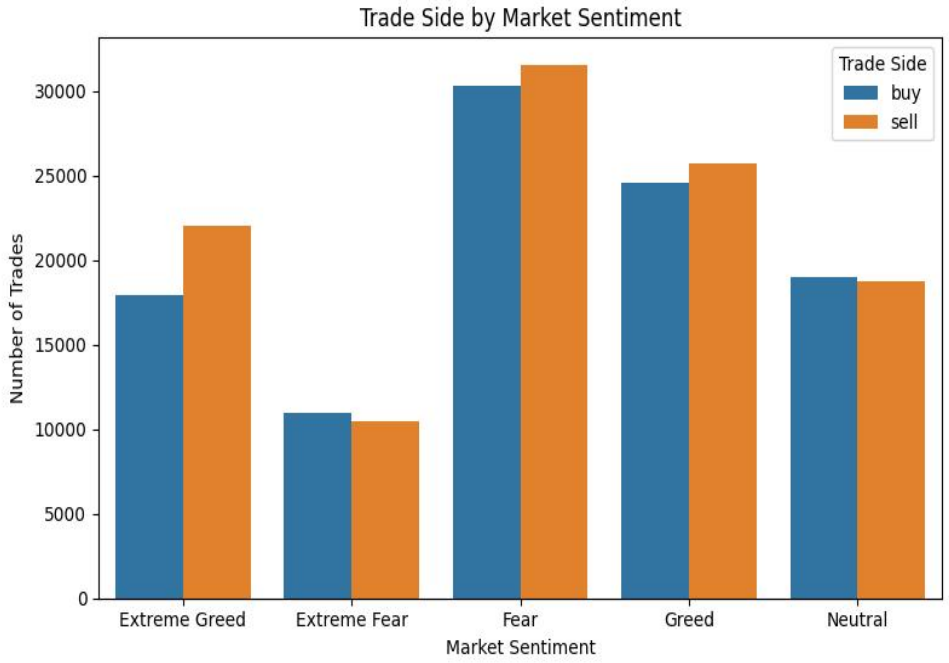
Suggests risk-on behavior and higher confidence during bullish sentiment.



4.3 Trading Side Bias (Buy/Sell) by Sentiment

Observation: "Buy" trades dominate in **Greed**, while "Sell" trades increase in **Fear** phases.

This reflects reactive vs speculative behavior aligning with sentiment trends.



5. Key Insights

Metric	Greed	Fear
Profitability	Higher	Lower
Volume	Higher	Lower
Side	More Buy	More Sell
Risk Appetite	Elevated	Cautious

6. Limitations

- **Leverage column** was missing; leveraged behavior couldn't be analyzed.
- No access to real-time strategy metadata (e.g., entry/exit strategy, signals)
- Simulated leverage could be added if needed for demo purposes.