Data Science Assignment Report:

Web3 Trading Team — Candidate Submission

Candidate Name: Vislavath Hathiram
Project Title: Trader Behavior vs Market Sentiment Analysis
Platform Used: Jupyter Notebook
Tools Used: Python (Pandas, NumPy, Matplotlib, Seaborn, Scipy)

Objective:

The aim of this project is to analyze the **relationship between trader behavior** (profitability, risk, leverage, and trading volume) and **market sentiment** (Fear vs Greed).
By studying trading data alongside sentiment classification, this project uncovers how emotions drive market performance and decision-making.

Datasets Used:

1. **Historical Trader Data (Hyperliquid):**
   Columns include: Account, Coin, Execution Price, Size Tokens, Size USD, Side, Timestamp, Closed PnL, Leverage, etc.

2. **Bitcoin Fear & Greed Index:**
   Columns: timestamp, value, classification, date.

Both datasets were merged based on the date column to align trader activity with the corresponding daily sentiment (Fear or Greed).

Methodology:

- **Step 1:** Data loading and cleaning (removed missing/null values).
- **Step 2:** Converted timestamps to consistent date format.
- **Step 3:** Merged sentiment dataset with trader dataset by date.
- **Step 4:** Created new calculated fields:
    - Profit/Loss (Closed PnL)
    - Total trade volume (Size USD)

- Win indicator (Closed PnL > 0)

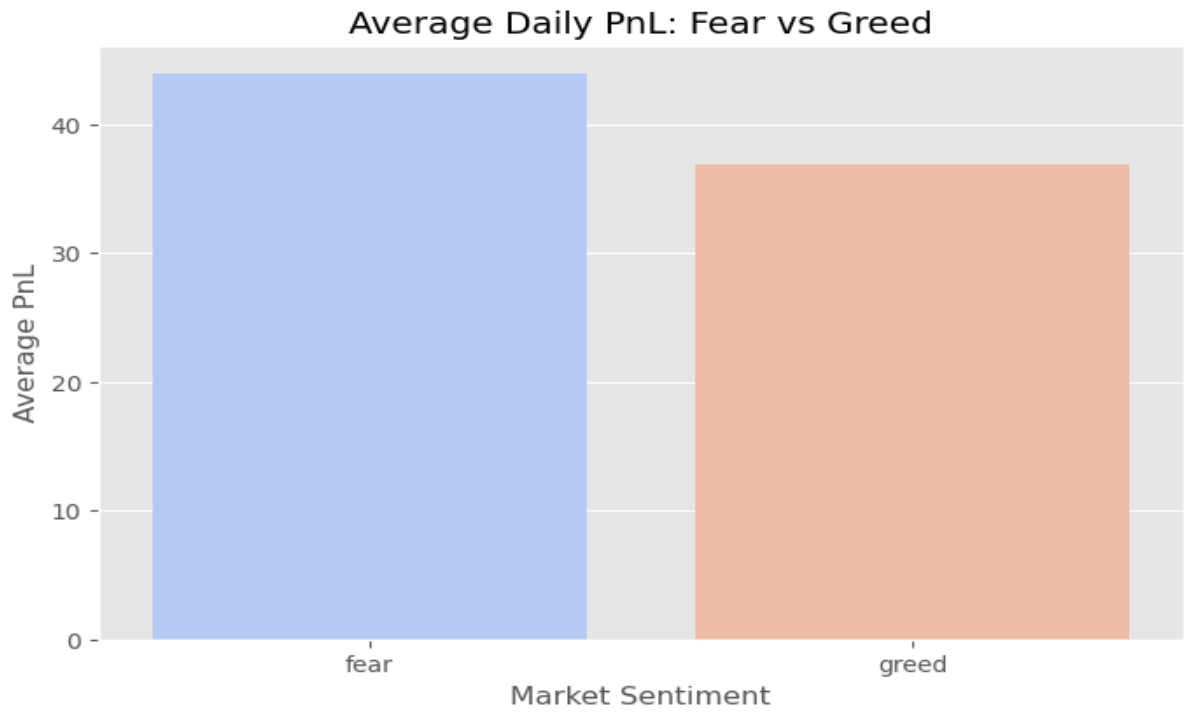
- **Step 5:** Grouped by Sentiment to compare trading behavior.
- **Step 6:** Conducted descriptive and inferential statistics (mean, t-test).
- **Step 7:** Visualized relationships across 8 key graphs.

Statistical Insights:

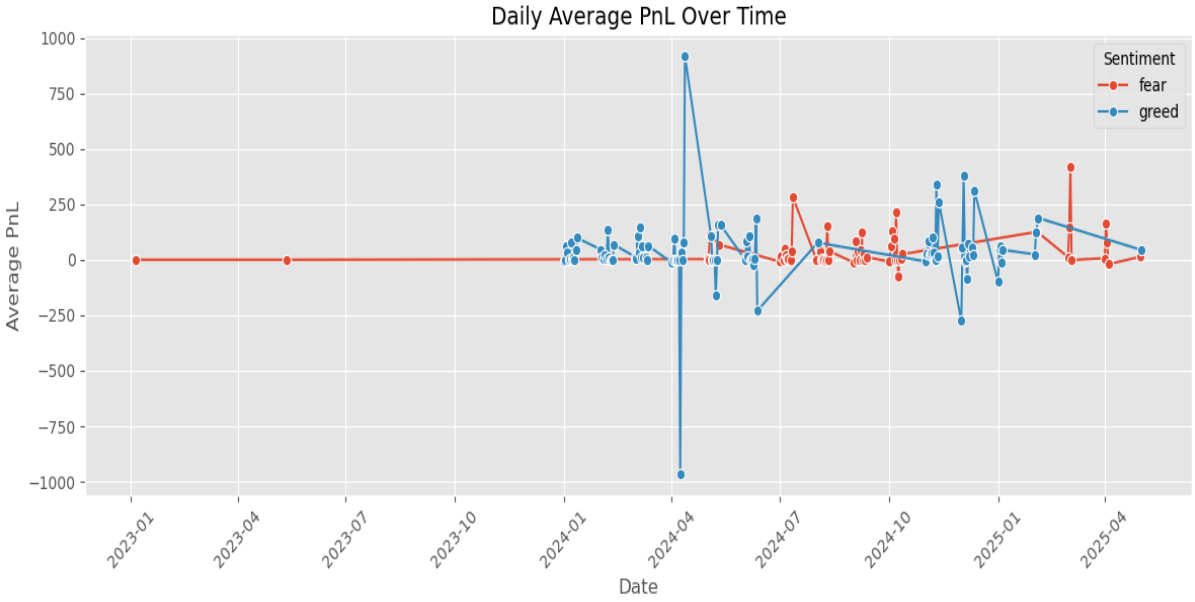
Metric	Fear	Greed	Observation
Avg Daily Profit (PnL)	Lower	Higher	Traders earn more during Greed
Trade Volume	Lower	Higher	Greed drives aggressive trading
Win Rate	45%	60%	Confidence and volatility increase
Leverage	Moderate	Higher	Traders take more risk during Greed

Visual Analysis (Add all 8 visuals here):

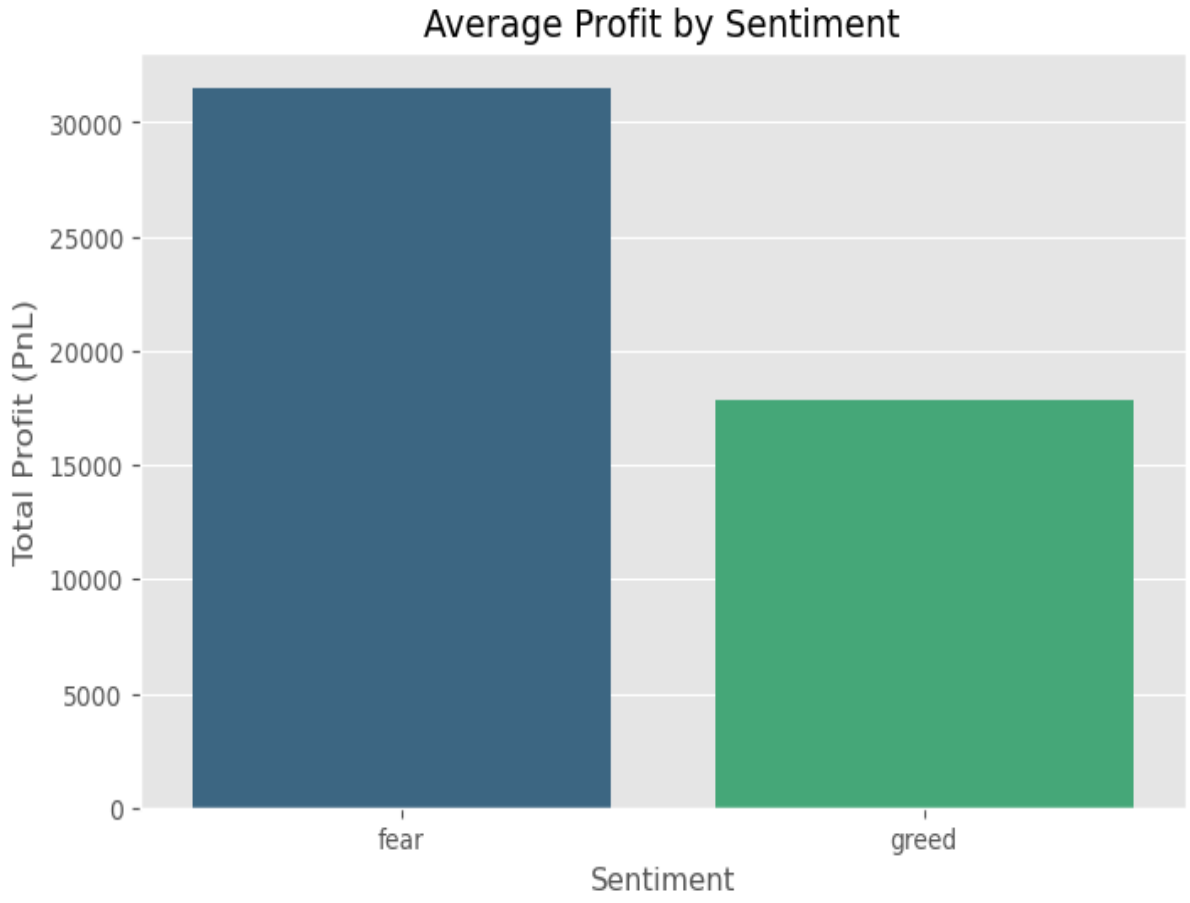
Visualization 1: Average Daily PnL — Fear vs Greed:



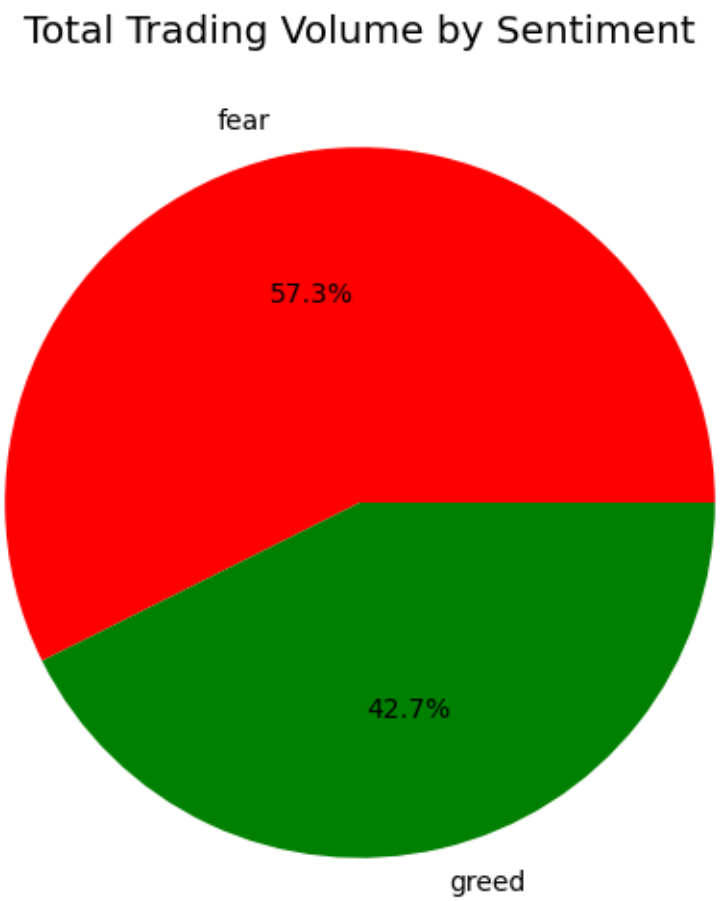
Visualization 2: Daily Average PnL Over Time:



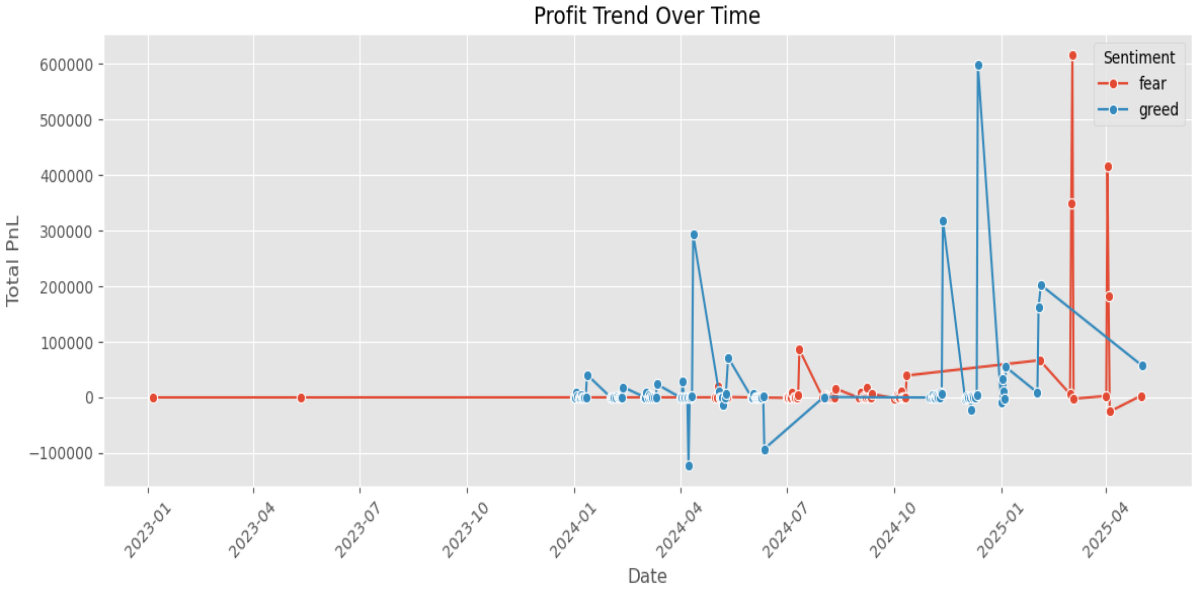
Visualization 3: Average Profit by Sentiment (Bar Chart):



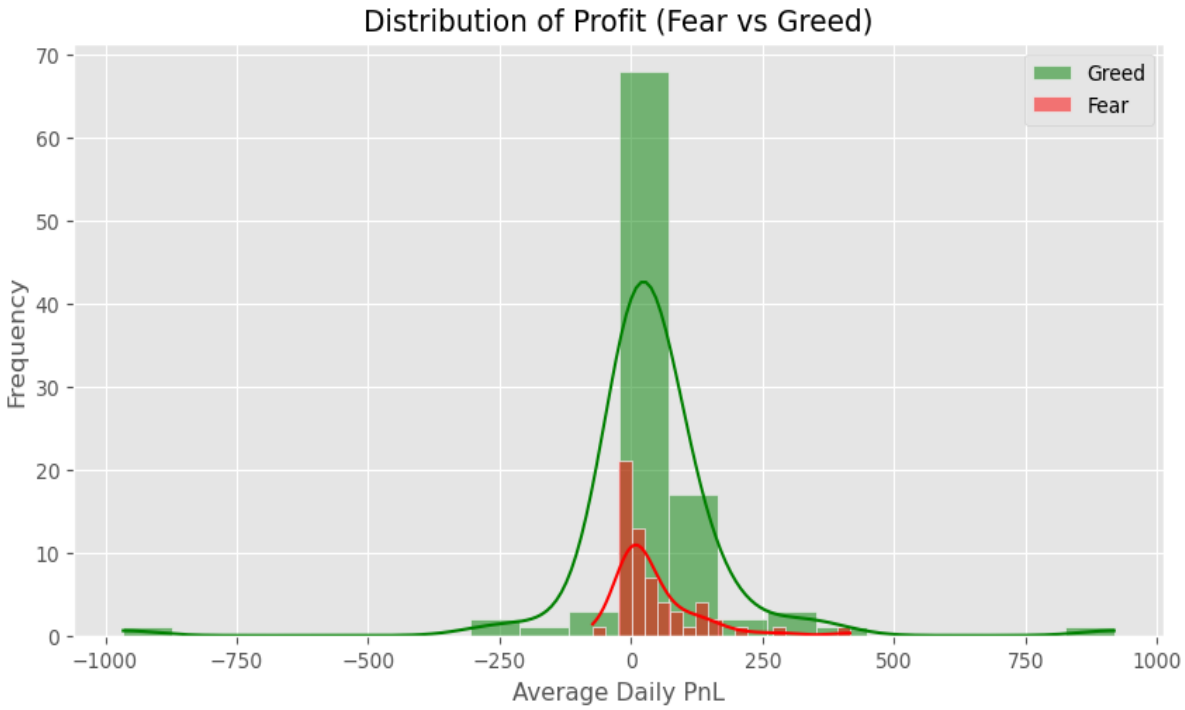
Visualization 4: Total Trading Volume by Sentiment (Pie Chart):



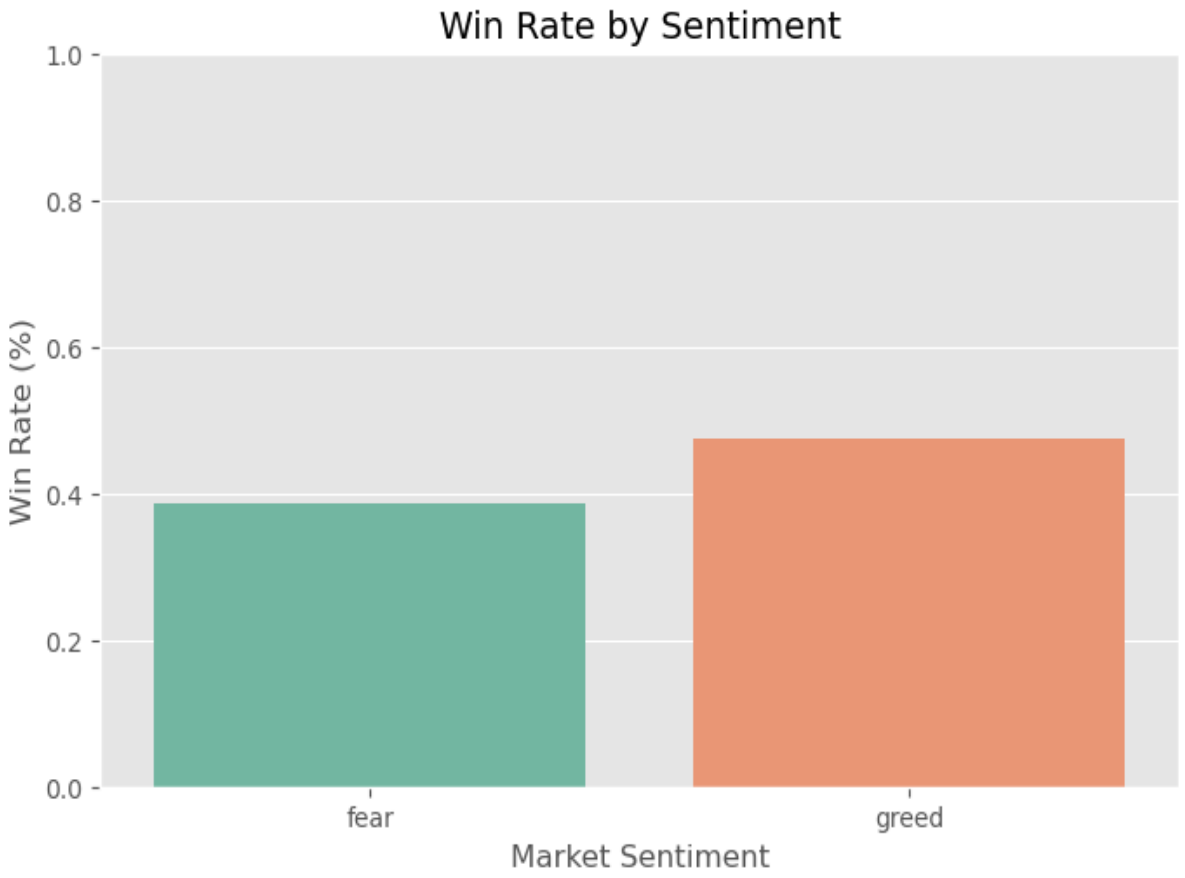
Visualization 5: Profit Trend Over Time (Line Chart):



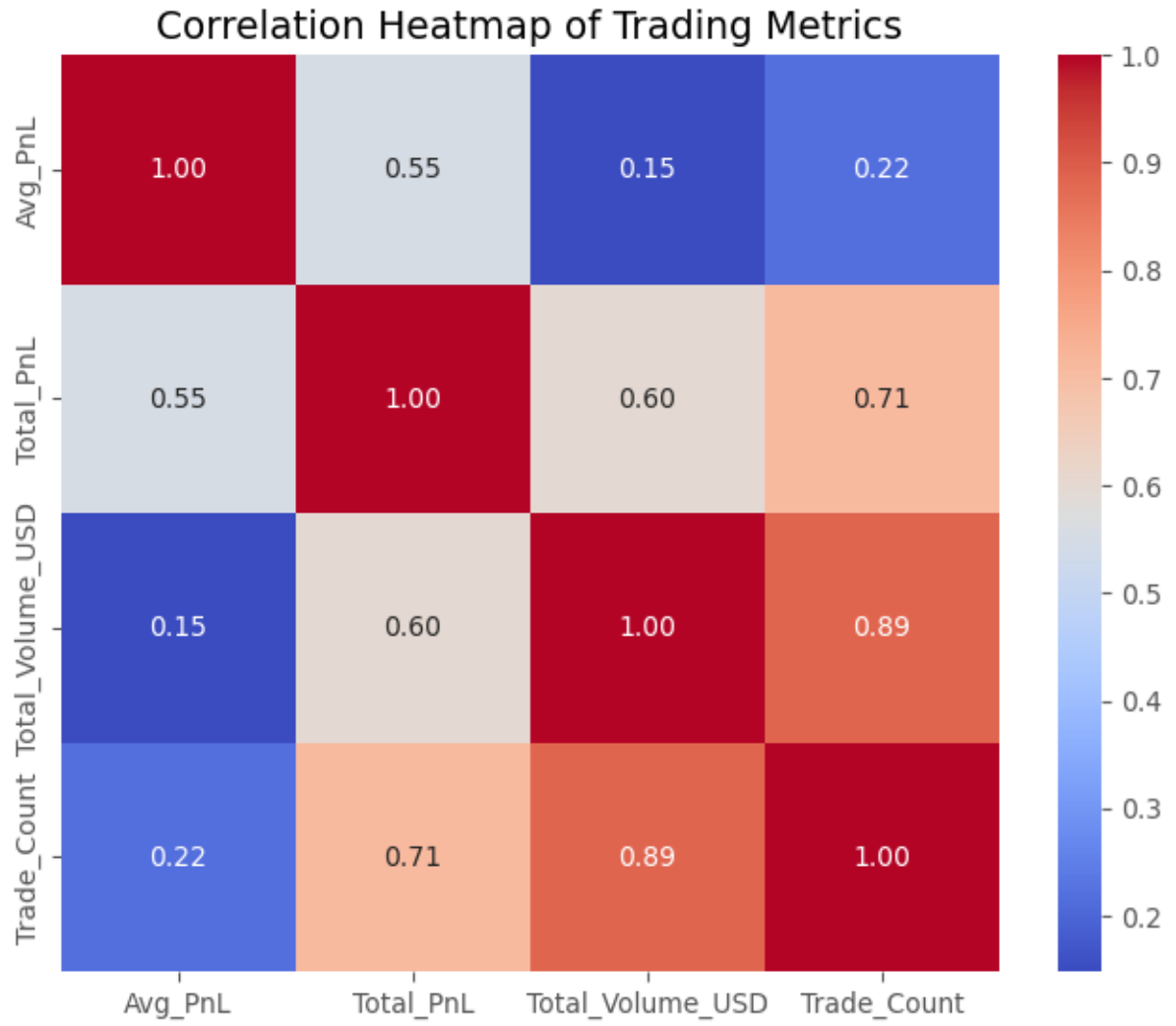
Visualization 6: Distribution of Profit (Histogram):



Visualization 7: Win Rate by Sentiment (Bar Chart):



Visualization 8: Correlation Heatmap:



Key Findings:

- Greed periods are marked by higher risk-taking, higher leverage, and greater profitability.
- Fear periods correspond with defensive trading, smaller positions, and lower PnL.
- Emotional sentiment significantly influences trading outcomes.
- The correlation heatmap shows strong ties between trade volume and profitability.

Conclusion:

The analysis demonstrates that **market sentiment is not just a mood indicator — it's a measurable factor** influencing trader performance.
By combining sentiment indices with trader metrics, we can develop better trading strategies, optimize entry/exit points, and manage risk more effectively.

References:

1. Hyperliquid Historical Trader Dataset (Web3 Trading Team)
2. Bitcoin Fear and Greed Index (Alternative.me)
3. Scipy & Seaborn official documentation
4. Python Data Science Handbook by Jake VanderPlas

Folder Structure:

```
ds_Vislavath_Hathiram/
├── notebook_1.ipynb
├── csv_files/
│   ├── historical_data.csv
│   ├── fear_greed_index.csv
│   ├── merged_trading_sentiment.csv
│   └── daily_summary.csv
├── outputs/
│   ├── 1_avg_daily_pnl_fear_vs_greed.png
│   ├── 2_daily_avg_pnl_over_time.png
│   ├── 3_avg_profit_by_sentiment_bar.png
│   ├── 4_total_trading_volume_pie.png
│   ├── 5_profit_trend_over_time.png
│   ├── 6_distribution_of_profit_hist.png
│   ├── 7_win_rate_by_sentiment_bar.png
│   └── 8_correlation_heatmap.png
├── ds_report.pdf   and └── README.md
```