**Data Analysis & Visualization Project Report**

1. Overview

This project analyzed trading behavior and sentiment trends to understand how profitability, risk, volume, and leverage align or diverge from overall market sentiment. The primary goal was to extract actionable insights from the dataset, identify hidden patterns, and summarize them in an easily interpretable format.

2. Data Description

* Dataset: Trading data including account, coin, execution price, volume, leverage, and profitability metrics.
* Time range: Daily data for the selected period.
* Preprocessing steps:
  + Cleaned missing values
  + Aggregated data per day for daily summary
  + Calculated key metrics such as total volume, average profit/loss, and leverage usage

CSV outputs generated:

* csv\_files/sentiment\_summary.csv → Overall summary metrics
* csv\_files/daily\_summary.csv → Daily trends and statistics

**3. Methodology**

1. **Data Extraction & Cleaning:** Imported raw trading data, removed invalid entries, and standardized column formats.
2. **Summary Calculations:**
   * Computed total trades, total volume, total profit/loss per account and coin
   * Calculated daily averages and percentage changes
3. **Visualization:**
   * Line plots to visualize daily trends
   * Bar charts for category comparisons (e.g., coins, accounts)
   * Heatmaps to visualize correlations (if applicable)
4. **Analysis:**
   * Compared trading metrics with market sentiment indicators (fear vs. greed)
   * Identified high-risk periods and profitable strategies

**4. Analysis & Visualizations**

4.1 Insights from CSV Summaries

* The sentiment\_summary.csv showed that
* Most trades are relatively small, but a few large trades heavily influence the average size.
* Profitability is moderate, with median PnL at 0, meaning most trades break even.
* Variability in PnL and extreme percentiles suggest some trades are very high-risk/high-reward.
* Win rates under 50% indicate that trading strategies are moderately successful, but traders rely on larger profitable trades to drive overall gains.

4.2 Insights from Visual Outputs (Charts & Graphs)

1. Daily PnL Trend:
   * Line plots indicate fluctuating profitability over time. Peaks often correspond with high-volume trades or favorable market conditions.
2. Trade Volume Distribution:
   * Bar charts of total USD per category show that a few accounts/coins dominate trading volume.
   * Smaller trades are much more frequent, confirming the skew seen in average vs median trade sizes.
3. Risk vs Reward Analysis:
   * Scatter plots and heatmaps reveal that higher-risk trades (higher volume or leverage) sometimes produce the highest profits but also the largest losses.
   * Correlation between trade size and PnL shows moderate positive trends, indicating that larger trades can yield higher returns.

4.3 Comparative Insights

Trading performance aligns partially with market sentiment:

Periods of high confidence (“greed”) correspond to larger trades and higher PnL.

During high-fear periods, trades are smaller, win rates drop, but some extreme wins still occur.

High-volume accounts consistently outperform smaller accounts, even though their win rate is comparable.

Variability in PnL suggests that risk management plays a critical role in profitability.

1. **Insights from daily\_summary.csv**

Insights

1. Daily PnL Trends
   * Most days show moderate profitability, but certain dates have extreme spikes (e.g., 19-02-2025: $6.7M).
   * Rolling 7-day PnL smooths out fluctuations, showing overall trends.
   * The spike on 27-10-2024 aligns with high daily volume, suggesting volume drives profit.
2. Market Sentiment Influence
   * Greed periods (28-03-2023, 14-11-2023, 27-10-2024) generally correspond to profitable days.
   * Extreme Greed (09-03-2024) led to a very high PnL, confirming riskier trades yielded large profits.
   * Surprisingly, on 19-02-2025 (Fear), there was a very high PnL. This indicates that some trades exploit market fear effectively.
3. Volume vs PnL
   * Higher trading volumes tend to coincide with higher daily PnL (e.g., 704M USD volume on 19-02-2025).
   * Some lower-volume days (28-03-2023) had zero profit, suggesting volume is a key driver.
4. Rolling 7-day PnL
   * Rolling averages smooth out extreme daily fluctuations and give a better sense of overall performance.
   * Peaks in rolling PnL often lag slightly behind extreme volume days, reflecting

**Comparative Insights (Using Daily Summary + Sentiment Summary)**

* **High-risk/high-reward patterns:** Extreme daily PnL spikes occur during **Extreme Greed** or very high volume days.
* **Consistency:** Moderate PnL on most other days aligns with average PnL from sentiment\_summary.csv.
* **Market sentiment:**
  + Greed periods = profitable trades
  + Extreme Greed = very high profit potential
  + Fear periods = occasional massive wins, likely from contrarian trades
* **Strategy takeaway:** Tracking daily volume and sentiment can improve timing and risk management for trades.

1. **Conclusion**

The analysis of trading behavior using the sentiment\_summary.csv and daily\_summary.csv datasets reveals several key patterns:

1. **Moderate but consistent profitability:**
   * Most trades have a median PnL of 0, indicating that over half of trades break even.
   * Mean PnL and extreme percentiles show that occasional high-risk trades drive overall gains.
2. **Impact of trade volume and size:**
   * High-volume trades and larger trade sizes generally correlate with higher daily profits.
   * Smaller trades dominate the dataset but contribute less to overall profit, confirming a skewed distribution of returns.
3. **Influence of market sentiment:**
   * Profits are generally higher during periods of **Greed** and **Extreme Greed**, as traders take advantage of favorable conditions.
   * Interestingly, some **Fear periods** also show high PnL, suggesting that contrarian strategies can yield significant returns.
4. **Risk and reward dynamics:**
   * Standard deviation of PnL is high, indicating variability in trade outcomes.
   * Traders using leverage or executing high-risk trades can achieve high profits but also face larger potential losses.
5. **Cumulative insights from daily trends:**
   * Rolling 7-day PnL highlights overall performance trends and smooths daily fluctuations.
   * Peaks in daily profit often follow high-volume trading days, emphasizing the importance of volume in profitability.

**Overall Conclusion:**  
The trading dataset demonstrates that strategic high-volume trades, guided by market sentiment, are the main drivers of profitability. While most trades are break-even, careful risk management and timing can maximize returns. Combining statistical summaries and visual analyses provides a comprehensive understanding of trading behavior, offering actionable insights for future trading strategies.