Internship Task Report
Task Title:
Analysis of Trading Behavior vs Market Sentiment (Fear vs Greed)

Objective:
The goal of this internship task was to analyze how traders' behaviours — including **profitability, risk exposure, trade volume, and leverage usage** — align or diverge from the overall **market sentiment**, typically represented by the **Fear and Greed Index**.
The ultimate objective was to uncover **hidden trading patterns, risk tendencies, and strategic insights** that could help in designing smarter trading strategies under varying emotional market conditions.

Steps Followed to Solve the Task:

1. **Data Collection & Understanding**
    - Datasets used:
        - trades_cleaned.csv — individual trade-level data (PnL, size, leverage, etc.)
        - merged_data.csv — aggregated daily metrics including profitability and sentiment classification.
        - fear_greed_index.csv & fear_greed_encoded.csv — market sentiment data (Fear vs Greed scores).
        - historical_data.csv — supplementary reference data for leverage and position tracking.
    - Understood structure, size, and data types of all CSVs before merging.
2. **Data Preprocessing**
    - Converted date/time columns into standard datetime format for all datasets.
    - Cleaned and standardized fields for **PnL**, **Volume**, and **Leverage**.
    - Merged datasets based on the date field to align trading activity with market sentiment.
3. **Feature Engineering**
    - Created new indicators such as:
        - **Profitability Metrics**: Total and mean Closed PnL.
        - **Trading Volume**: Total and mean traded amount per sentiment state.
        - **Average Leverage**: Estimated trader risk-taking tendency.
        - **Sentiment Classification**: Fear, Neutral, and Greed states.
4. **Exploratory Data Analysis (EDA)**
    - Computed **summary statistics** of trading performance under each sentiment.
    - Analyzed **win rate** — percentage of profitable trades under each sentiment.
    - Visualized **PnL vs Sentiment** and **Leverage vs Sentiment** using output plots:
        - pnl_fear_vs_greed_with_points.png
        - avg_leverage_fear_greed.png
    - Correlation analysis between **Fear-Greed score** and **Closed PnL** to assess market mood impact on performance.
5. **Key Insights**

- During **Greed phases**, trading volume and leverage tended to increase, indicating higher risk appetite.
- **Fear phases** showed reduced leverage and conservative trading behavior.
- Profitability sometimes diverged from sentiment — showing traders often overextend during high greed.
- Moderate fear periods occasionally delivered better risk-adjusted returns.
- Identified patterns suggesting **contrarian opportunities** during extreme greed or fear zones.

6. **Interpretation**
   - Market sentiment influences trading volume and leverage, but not always profitability.
   - Overconfidence in greed phases and over-caution in fear phases can both hurt long-term performance.
   - Maintaining consistent position sizing and leverage discipline across sentiments yields more stable returns.

Conclusion:
This analysis revealed that **emotional market states (Fear vs Greed)** significantly influence trader behavior.
While volume and leverage increase in greed conditions, profitability does not always follow suit — highlighting the importance of **data-driven and sentiment-aware trading strategies**.
The results suggest that traders and algorithmic systems could benefit from integrating **sentiment signals** to modulate risk exposure, improve entry timing, and reduce behavioral biases.