**Data Analysis Project Report**

# Introduction

This report summarizes the analysis performed on trader Profit & Loss (PnL) data merged with the Fear & Greed Index. The goal of this project was to explore how market sentiment influences trading behavior, visualize Buy/Sell patterns, and investigate correlations between sentiment and profitability.

## Data Description

Two datasets were used in this analysis:

1. **Historical Data** — containing transaction details, trade direction (Buy/Sell), and profitability.
2. **Fear & Greed Index** — representing overall market sentiment on a daily scale.

These datasets were merged on the **date** field to enable sentiment-based analysis of trading activity.

## Methodology

The following steps were carried out in the notebook:

* **Data Preprocessing**: Handling missing values, aligning dates, and cleaning sentiment values.
* **Data Enrichment**: Adding derived columns to represent sentiment categories (Greed vs. Fear).
* **Merging Datasets**: Trader PnL data combined with sentiment index by date.
* **Exploratory Data Analysis (EDA)**: Performed using Pandas, Matplotlib, and Seaborn to generate statistical summaries and visual insights.
* **Group Analysis**: PnL summarized by sentiment type to compare average profitability across conditions.

## Results & Insights

Key findings from the analysis include:

* **PnL Distribution**: Trader profitability distributions were compared across different sentiment levels.
* **Behavioral Patterns**: Visualizations revealed Buy/Sell trends under Greed and Fear conditions.
* **Correlation Check**: Weak correlation was observed between the sentiment index and profitability.
* **Emotional Bias**: Traders exhibited behavioral shifts during Greed phases, but this did not necessarily translate to higher profits.

## Conclusion

The analysis concludes that while market sentiment influences **trading behavior**, it does not have a strong correlation with **actual profitability**. Emotional biases play a role in decision-making, but consistent strategies and discipline are required for long-term success.

This highlights the importance of avoiding overreliance on sentiment indices and instead focusing on robust trading strategies backed by data-driven decision-making.