Trading Sentiment Analysis

Project Overview

This project analyzes trading performance in relation to **market sentiment** using historical trader data and a **Fear & Greed Index**.
It merges trade-level metrics (price, size, profit/loss, leverage) with market sentiment (fear/greed classification) to understand how emotions influence trading behavior.

Files

File	Description
`historical_data.csv`	Raw trade data containing timestamps, prices, trade sizes, PnL, etc.
`fear_greed_index.csv`	Daily sentiment index (Fear, Greed, Neutral) with corresponding dates.
`analysis_script.py`	Main Python script that cleans, merges, and visualizes data.
`/outputs/`	Folder containing generated visualizations and summary charts.

Setup Instructions

1. Install dependencies

```
pip install pandas numpy matplotlib seaborn
```

2. Place your files

Make sure both data files are uploaded to the `/content` directory (if using Google Colab):

```
/content/historical_data.csv
/content/fear_greed_index.csv
```

3. Run the script

In Colab or VS Code, run:

```
python analysis_script.py
```

Or, if running cell by cell, start from imports and proceed in order.

Data Cleaning & Preprocessing

- Converts timestamps to datetime and extracts date.
- Renames columns to a consistent lowercase format.
- Calculates **leverage** as:

  `Leverage = Position Value / Start Position`

- Removes missing or infinite values.
- Merges datasets by `date` to align trades with daily market sentiment.

Visual Outputs

The script generates and saves the following charts in `/content/outputs`:

Chart	Filename	Description
Trade Count by Sentiment	`trade_count.png`	Number of trades under Fear vs Greed.
Average Profit by Sentiment	`avg_profit_sentiment.png`	Mean Closed PnL grouped by sentiment.
Leverage Distribution	`leverage_sentiment.png`	Boxplot showing leverage behavior by sentiment.
Trade Size Distribution	`trade_size_tokens_dist.png`	Histogram of trade sizes by sentiment type.
Correlation Heatmap	`correlation_heatmap.png`	Correlation among key trading metrics (PnL, leverage, etc.).

Example Insights

- Traders tend to use **higher leverage** during "Greed" phases.
- **Closed PnL** averages may decline during "Fear" sentiment.
- Positive correlation often observed between **leverage** and **PnL volatility**.

Key Columns Used

Column	Description
execution_price	Price at which the trade was executed.
size_tokens	Quantity of tokens traded.
closed_pnl	Profit or loss for the trade.
position_value	Total dollar value of the position.
start_position	Initial margin used to open the trade.
leverage	Calculated ratio of position value to margin.
classification	Sentiment label (Fear, Greed, Neutral).

Outputs Folder Structure

```
/content/outputs/
    trade_count.png
    avg_profit_sentiment.png
    leverage_sentiment.png
    trade_size_tokens_dist.png
    correlation_heatmap.png
```

Future Enhancements

- Add time-series trend analysis of leverage over sentiment cycles.
- Integrate real-time sentiment APIs.
- Automate daily report generation (PDF summary).