

# Project Summary: Trader Behavior vs Market Sentiment

## Methodology

This project analyzes how trader behavior changes under different market sentiment conditions, specifically **Fear** and **Greed** phases. The dataset was first cleaned and preprocessed to handle missing values, normalize categorical variables, and segment traders based on trading frequency, leverage usage, trade size, and holding duration.

Exploratory Data Analysis (EDA) was conducted using aggregated metrics such as **average trade frequency**, **average trade size**, and **leverage distribution** across sentiment categories. Visualizations were generated to compare trader behavior under varying sentiment conditions. Traders were further segmented into behavioral groups (e.g., high-frequency, high-leverage, short-term holders) and mapped against sentiment-driven classifications to identify consistent behavioral patterns.

All outputs were saved as visual PNG files for interpretability and reporting.

## Key Insights

- Traders exhibit **higher trading frequency during Greed periods**, indicating increased market participation and confidence.
- **Average trade size tends to increase during Greed**, while Fear periods show more conservative position sizing.
- High-leverage usage is more prominent in Greed phases, increasing overall market risk exposure.
- During Fear sentiment, traders prefer **shorter holding durations** and reduced leverage, reflecting risk-averse behavior.
- Behavioral segmentation shows that sentiment significantly influences trader decision-making patterns, especially among high-frequency and leveraged traders.

## Strategy Recommendations

- **Risk Management:** Implement stricter leverage limits and position sizing controls during Greed phases to mitigate excessive risk.
- **Sentiment-Aware Trading:** Incorporate sentiment indicators into trading strategies to dynamically adjust exposure.
- **Trader Profiling:** Use behavioral segmentation to identify high-risk traders during volatile market conditions.
- **Market Monitoring:** During Fear phases, focus on liquidity support and reduced transaction costs to encourage stable participation.

Overall, this analysis demonstrates that **market sentiment is a strong driver of trader behavior** and can be effectively used to enhance trading strategies, risk controls, and market surveillance systems.

