**📊 Bitcoin Trading Sentiment Analysis – Project Documentation**

**1. 📌 Project Overview**

This project investigates the relationship between market sentiment (Fear & Greed Index) and trader performance on the Hyperliquid platform. By combining sentiment classification with historical trade data, we aim to uncover actionable insights that inform better trading strategies.

**2. 📁 Datasets Used**

**A. Bitcoin Market Sentiment Dataset**

**B. Hyperliquid Trader Data**

**3. ⚙️ Data Processing**

* Parsed dates and synchronized time format.
* Merged sentiment and trader datasets on the date field.
* Filtered outliers and invalid trades.
* Derived new fields:
  + Leverage (est.) = (Start Position + Trade Size) / Trade Size
  + is\_win = True if Closed PnL > 0, else False

**4. 📈 Analysis Performed (7 Key Visuals)**

**1. Correlation between Sentiment Index & Closed PnL**

* Used scatter + regression plot.
* Weak positive correlation observed.

**2. Average Closed PnL by Sentiment**

* Traders performed slightly better in Greed markets.

**3. Daily PnL Trends by Sentiment**

* Line chart showed strong volatility in Fear periods.

**4. Leverage vs PnL by Sentiment**

* High leverage trades had extreme outcomes (both profit and loss).
* Used estimated leverage formula.

**5. Trade Size vs PnL by Sentiment**

* Regression showed larger trades more volatile in Fear periods.

**6. Win Rate by Sentiment**

* Greed periods had higher win rates (~60%+).
* Calculated as % of trades with Closed PnL > 0.

**7. PnL Volatility by Sentiment (Box Plot)**

* Fear periods had wider spread in PnL outcomes.
* Volatility = daily PnL standard deviation.

**5. 📌 Key Insights**

* **Greed markets** show **higher win rates** and **better average PnL**.
* **Fear markets** are **more volatile**, with wider distribution of outcomes.
* Estimated **leverage** increases both risk and reward, especially in volatile conditions.
* **Trade size** is a double-edged sword — larger trades can amplify losses or gains.

**7. 🧠 Recommendations**

* **Reduce leverage** during Fear periods to manage volatility.
* **Cap trade size** in uncertain sentiment conditions.
* Build **sentiment-aware trading bots** that adjust risk levels dynamically.
* Continue tracking **real-time sentiment** as part of pre-trade analysis.