# **Data Science Assignment – Trader Behavior Insights**

**Candidate:** **Bhumika Tusamad**

**Overview**

This document presents my submission for the **Web3 Trading Data Science Internship**. The goal of this analysis was to explore how **trader behavior** interacts with **Bitcoin market sentiment** and uncover patterns that could inform smarter trading strategies.

The analysis focuses on understanding:

* How trader **profitability** varies with market sentiment
* Differences in **trade sizes** across different market conditions
* Buy/Sell behavior of traders in relation to Fear and Greed
* Trends and insights that could influence trading decisions

**Datasets Used**

1. **Trader Data (trader\_data.csv)**
   * Contains historical trades from Hyperliquid including trade size, execution price, trade direction, and closed PnL.
2. **Market Sentiment (bitcoin\_sentiment.csv)**
   * Provides the Bitcoin Fear & Greed Index for each day, showing overall market sentiment.

**Folder Structure**

The assignment follows a structured format for clarity and reproducibility:

* **notebook\_1.ipynb** – Main Colab notebook containing all analysis
* **csv\_files/** – Contains the raw datasets (trader\_data.csv and bitcoin\_sentiment.csv)
* **outputs/** – Includes charts and the final report (ds\_report.pdf)  
  + avg\_profit\_by\_sentiment.png
  + avg\_size\_by\_sentiment.png
  + buy\_sell\_by\_sentiment.png
* **README.md** – This document

**How to Use**

1. Open notebook\_1.ipynb in **Google Colab**.
2. Mount Google Drive if needed to access the CSV files.
3. Run all cells sequentially to reproduce the analysis and visualizations.
4. Charts and report are stored in the outputs/ folder for reference.

**Key Insights**

* Traders are generally **most profitable during Greed** periods.
* **Trade sizes** tend to be larger during Greed and smaller during Extreme Fear, reflecting cautious behavior in extreme market conditions.
* **Buy trades** dominate during Fear periods, suggesting traders often attempt to “buy the dip.”
* **Sell trades** dominate during Extreme Greed periods, indicating profit-taking behavior.
* Overall, trader behavior **partially aligns with market sentiment**, offering actionable insights for smarter trading strategies.

**Additional Notes**

* Analysis was conducted in **Python 3.12** using **pandas**, **matplotlib**, and **seaborn**.
* This report is structured to make the analysis **clear, reproducible, and easy to interpret**.