Bitcoin Market Sentiment & Trader Behavior Analysis

Candidate: Dhanushri Muthukumaran

---

1. Objective

The goal of this project was to analyze how a trader's performance varied across different market sentiments by combining the Bitcoin Fear and Greed Index with historical trading data. The analysis reveals behavioral patterns, performance trends, and psychological signals that emerge during periods of fear, greed, neutrality, and extreme sentiment conditions.

This project mainly aims to:

- Analyze how trader profitability (PnL) changes across sentiment types like Extreme Fear, Fear, Neutral, Greed, and Extreme Greed.
- Examine the relationship between market sentiment, win rates, trading volume, and risk-taking behavior.
- Identify sentiment states that consistently lead to better or worse trading outcomes.
- Detect hidden behavioral patterns that can help traders make more thoughtful and strategic decisions.
- Provide insights that support trading teams in identifying opportunities, reducing risks, and improving strategy development during unstable market conditions.

2. Methodology

This project analyses the relationship between trader performance and sentiment in the Bitcoin market using an organized data-science workflow. The following steps are part of this methodology:

1. **Data Collection**
   The datasets provided were downloaded and imported into Google Colab for preprocessing and analysis.
2. **Data Cleaning & Preparation**
   The timestamp columns of the historical trader data were converted to a standard format.
   To merge the datasets, only the date component was extracted and the necessary columns were renamed for consistency (e.g., *date → Date*).
   Missing, inconsistent, and duplicate rows were checked and handled as part of the data-cleaning process.
3. **Data Merging**
   The trader dataset and sentiment dataset were merged on the *Date* column so that trading performance (PnL, win/lose outcome) could be combined with the market's sentiment classification for each day.

4. **Feature Engineering**
   A win/lose indicator was created based on Closed PnL (win = Closed PnL > 0).
   Market sentiments were categorized into: **Extreme Fear, Fear, Neutral, Greed, Extreme Greed.**
5. **Exploratory Data Analysis (EDA)**
   Key metrics were computed by grouping records based on market sentiment, including:

- Average Closed PnL
- Win Rate
- Trading Volume
- Risk indicators (if available)

Bar charts and pie charts were used to visualize how profitability and win rates differ across sentiment states.

6. **Interpretation & Insights Extraction**
   At the end of the analysis, trader behavior under different sentiment conditions was compared, trends such as periods of increased profitability were identified, and behavioral patterns influencing trading outcomes were highlighted.

3. Key Insights

Trend 1 — Profitability is Highest During Extreme Greed

Sentiment	Avg. Profit (PnL)
Extreme Greed	**67.89**
Fear	54.29
Greed	42.74
Extreme Fear	34.53
Neutral	34.30

Traders tend to earn **more profit when market sentiment shows Extreme Greed**.

Trend 2 — Win Rate Highest During Extreme Greed

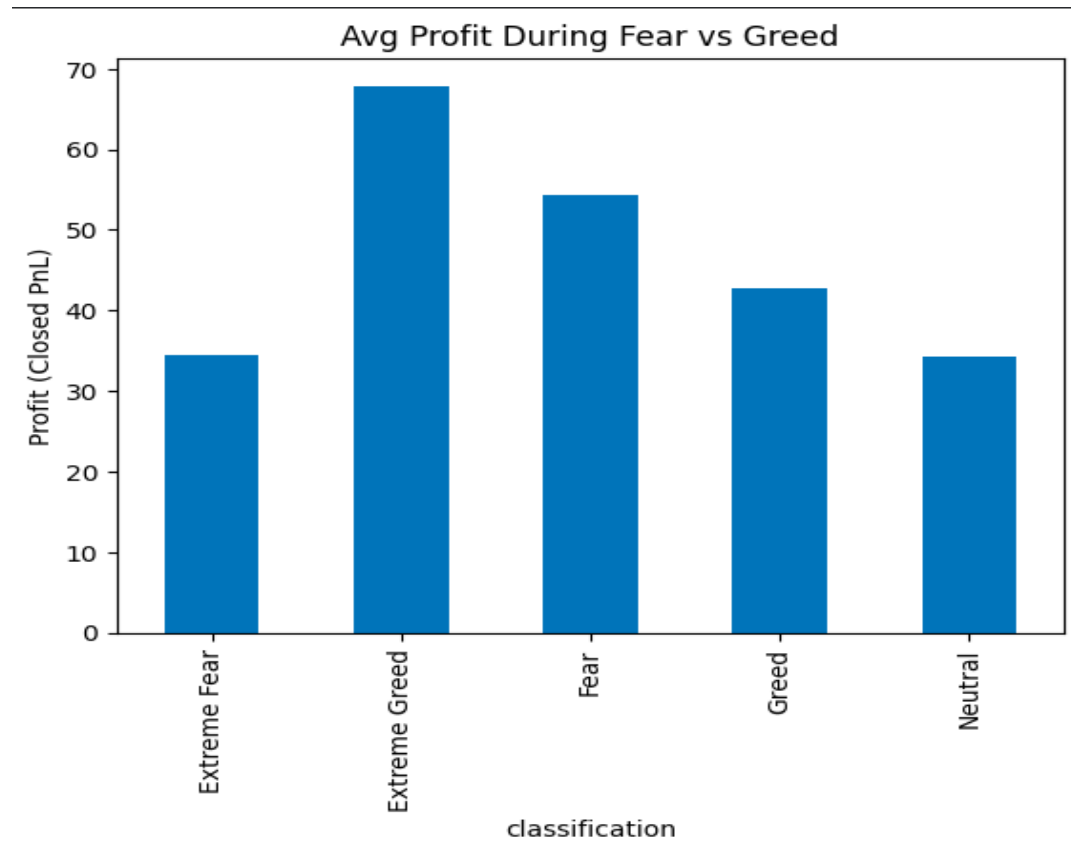| Sentiment	Win Rate
Extreme Greed	**46.5%**
Fear	42.0%
Greed	38.4%
Extreme Fear	37.0%
Neutral	39.6%

More profitable trades occur during Extremely Greedy markets.

---

4. Visualizations

- Bar Chart

- Pie Chart

Win Rate During Market Sentiments
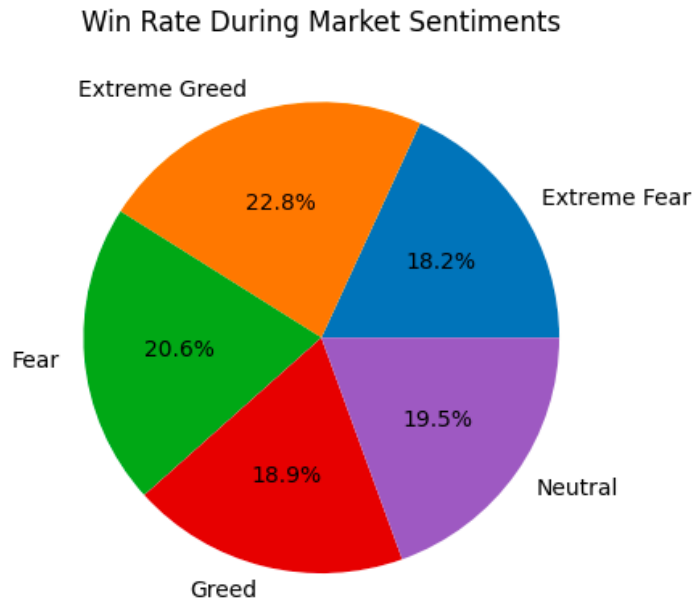
5. Conclusion

This analysis has combined the Crypto Fear & Greed Index with Hyperliquid historical trading data, exploring the role played by market sentiment in trader performance. The results of such a setup show that traders are performing better, both in average profit and in win rate, during times of Extreme Greed, while there was a dramatic drop in performance due to the conditions of Extreme Fear. This would hint that high confidence in the market and positive sentiment might be related to more favorable trading environments, while highly volatile and fearful markets may feature the potential for lower profitability. Sentiment cannot predict individual outcomes on its own, but incorporating sentiment indicators into the trading strategy does yield meaningful insights into the process of risk management and decision-making. Overall, the current study recognizes practical value in sentiment data with regard to trader behavior analysis improvement and creating wiser data-driven trading strategies.t