Bitcoin Market Sentiment vs Trader Performance

1. Introduction

This project investigates the relationship between Bitcoin market sentiment—measured using a Fear/Greed Index—and trader performance. By analyzing sentiment data alongside BTC-USD price movements, the project aims to uncover patterns that can inform smarter trading strategies. The study integrates data analysis, signal generation, backtesting, and performance evaluation.

2. Dataset

The dataset consists of two main sources: - Bitcoin Market Sentiment Dataset (Fear/Greed Index): Contains dates and classification labels (Fear or Greed), with additional numeric indices where available. - BTC-USD Price Data: Daily closing prices retrieved via Yahoo Finance (yfinance).

3. Methodology

The methodology follows these steps:

1. Load and preprocess sentiment and price data.
2. Engineer lagged features of sentiment to avoid look-ahead bias.
3. Generate trading signals: (A) Follower Strategy (go long on Greed), (B) Contrarian Strategy (go long on Fear), and (C) Extreme Fear Mean-Reversion (buy during extreme fear events).
4. Benchmark performance against a Buy & Hold strategy.
5. Apply transaction cost assumptions to ensure realistic backtesting.
6. Evaluate performance using metrics such as CAGR, Sharpe Ratio, Maximum Drawdown, and Hit Rate.
7. Conduct statistical tests: Information Coefficient (IC), conditional returns by sentiment regime, lagged correlations, and t-tests between strategies and Buy & Hold.
8. Visualize results with equity curves, conditional return charts, and lag correlation plots.

4. Results & Insights

- **Performance Metrics**: Strategies were compared to Buy & Hold. Follower and Contrarian strategies performed differently depending on the regime, while Extreme Fear often indicated strong mean-reversion opportunities. - **Information Coefficient (IC)**: Correlation analysis showed whether sentiment is predictive or reactive with respect to Bitcoin returns. - **Conditional Returns**: Market returns varied across sentiment regimes (Extreme Fear, Fear, Neutral, Greed, Extreme Greed). Typically, periods of Fear were followed by stronger recoveries. - **Lag Analysis**: Cross-correlation suggested whether sentiment leads or lags price movements. - **Statistical Tests**: T-tests validated whether strategy returns were significantly different from Buy & Hold.

5. Conclusion

The project demonstrates that market sentiment, as captured by the Fear/Greed Index, can be a useful indicator for designing trading strategies. Contrarian strategies tend to profit from periods of extreme fear, while follower strategies may align with market momentum during greed phases. The analysis provides actionable insights for traders and investors seeking to integrate sentiment data into their decision-making process.