Trader Behavior Analysis Under Market Sentiment Regimes

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Objective

The objective of this analysis is to understand how trader performance and behavior vary under two different Bitcoin market sentiment regimes, **Fear** and **Greed**. By combining historical trader-level data with market sentiment indicators, the goal is to uncover behavioral patterns, risk characteristics, and trader profiles that can inform smarter trading strategies and capital allocation.

Datasets Used

1. **Different Sentiment Dataset:**
    - Daily sentiment labels: Fear, Extreme Fear, Neutral, Greed, Extreme Greed
    - Simplified into two regimes: Fear and Greed
2. **Historical Trader Data:**
    - Trade-level data including:
        - Trader account
        - Timestamp
        - Closed PnL
        - Trade size (USD)

Data Preparation Summary

- Trade timestamps were converted to dates to align with daily sentiment.
- Extreme Fear and Extreme Greed were merged into Fear and Greed respectively.
- Neutral sentiment was excluded to maintain clear regime comparison.
- Extreme outliers were retained but additionally analyzed using trimmed views for robustness.

Methodology

The analysis was conducted at two levels:

Sentiment-Level Analysis

- Aggregate performance metrics were computed for Fear and Greed regimes:
    - Total PnL
    - Average PnL
    - Trade count
    - Average trade size
    - Volatility (standard deviation)
    - Approximate risk-adjusted return (Sharpe proxy)

Trader-Level Analysis

- Trader performance was analyzed separately under Fear and Greed.
- Traders were classified based on relative performance:
  - Fear-Resilient (Contrarian) traders
  - Greed-Optimized (Trend-Following) traders
- Top-performing traders were identified per sentiment regime.

Key Findings

Sentiment-Level Insights

- Greed regimes generate higher total and average PnL, but with elevated volatility.
- Fear regimes exhibit larger average trade sizes, suggesting selective but higher-conviction positioning.
- Risk-adjusted performance (Sharpe proxy) is comparable across regimes, with slight advantages during Greed.

Distributional Behavior

- PnL distributions in both regimes show heavy tails and frequent outliers.
- Median PnL is close to zero, reflecting high-frequency or low-margin trading behavior.
- These characteristics are consistent with real-world crypto trading environments.

Trader Behavior Patterns

- Trader performance is not uniform across sentiment regimes.
- A subset of traders consistently outperforms during Fear, indicating contrarian or disciplined strategies.
- Other traders perform significantly better during Greed, aligning with momentum-based or trend-following behavior.

Trader Personas Identified

Trader Type	Description
Fear-Resilient (Contrarian)	Traders who outperform during Fear, often using disciplined risk management and selective entries
Greed-Optimized (Trend-Following)	Traders who benefit from high-liquidity, momentum-driven market conditions

These personas can be used to tailor strategy allocation depending on prevailing market sentiment.

Strategic Implications

Based on the analysis, the following strategies are recommended:

- **Sentiment-Aware Allocation**
  Allocate more capital to Fear-Resilient traders during downturns and Greed-Optimized traders during bullish phases.
- **Risk Controls During Greed**
  Implement leverage and drawdown limits to manage volatility during Greed regimes.
- **Trader Profiling for Platform Intelligence**
  Use trader sentiment profiles to enhance leaderboard rankings, copy-trading recommendations, or risk dashboards.

Limitations & Future Work

Limitations

- Sentiment is treated as a daily, market-wide indicator.
- Sharpe ratio is approximated and not annualized.
- Intraday sentiment shifts are not captured.

Future Enhancements

- Multi-class sentiment modeling (Fear / Neutral / Greed)
- Trader clustering using behavioral metrics
- Regime-aware performance forecasting
- Time-series analysis of trader adaptability

Conclusion

This analysis demonstrates that market sentiment plays a significant role in shaping trader behavior, profitability, and risk. By identifying sentiment-dependent trader profiles and understanding regime-specific dynamics, trading platforms can design smarter, more adaptive strategies that improve both performance and risk management.