

Xtreamly AI Volatility Extreme Classification

Xtreamly
info@xtreamly.com

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Abstract

Xtreamly aims to identify short periods of extreme volatility in the cryptocurrency markets to enable rapid response to potential whale movements. This paper presents the properties of extreme volatility classification, its applications, and the implementation of the API. These innovations support advanced DeFi strategies by enabling scenario-based decision-making and effective risk management.

1 Introduction

1.1 Problem Definition

Cryptocurrency markets often exhibit extreme volatility, driven by rapid price movements and evolving conditions. Identifying and predicting these occurrences provides a clear understanding of market regimes, which is essential for traders and investors aiming to optimize strategies and mitigate risk.

1.2 Applications

Below are key use cases for extreme volatility scenarios:

- **Avoiding Impermanent Loss:** Pausing operations briefly (e.g., in market making or liquidity provision) during volatile periods to reduce exposure.
- **Hedge Signal Generation:** In highly volatile scenarios, Xtreamly's model issues timely hedge signals to minimize hedging costs and optimize exposure management during rapid market shifts.

2 Methodology

The extreme volatility classification model is proprietary, but the statistical criteria are as follows:

- **Minutely Return:** The average minute-by-minute price change exceeds 1

- **Period Return:** The average price change over the period exceeds 1
- **Period Coverage:** Extreme periods cover at most 5% of the total time in the testing dataset.

2.1 Predictive Models

Xtreamly leverages proprietary volatility prediction models and evaluates short-term forecasts (up to 15 minutes ahead) to anticipate high-volatility momentum, rather than merely detecting volatility at each instant.

2.2 Tokens Applied

Model predictions were applied to BTC, ETH, and SOL. Results were largely consistent across these tokens; this paper focuses on ETH outcomes, with BTC visualizations provided in the Appendix. Any material differences are highlighted where applicable.

2.3 Testing Periods

Model performance was evaluated using 1-minute data from Q4 2024 and Q1 2025. The models defining extreme volatility were trained independently, excluding these testing periods from their training data.

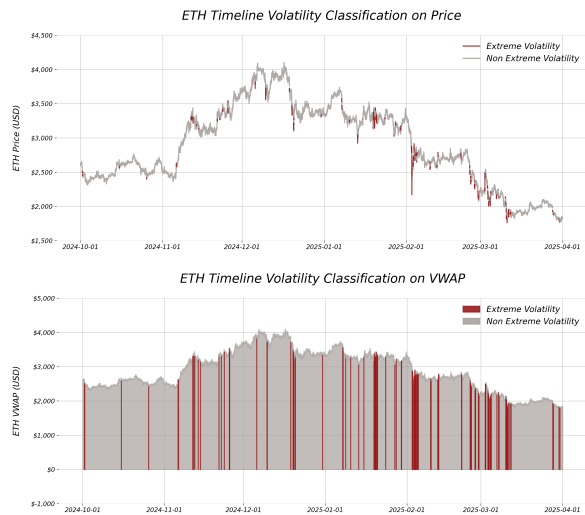
3 Backtesting Results

3.1 Period Summary

The extreme volatility classification successfully identifies short, intense periods of market activity, meeting the defined statistical criteria.

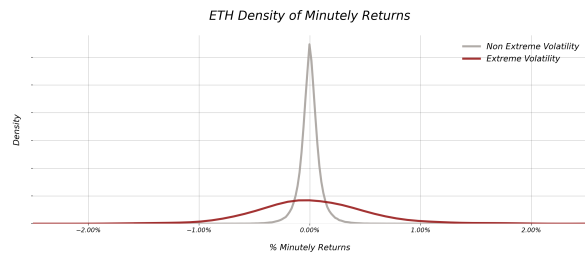
Symbol	Volatility	Avg. Instances Monthly	% Time Coverage	Avg. Duration Hours	Max Duration Hours	1th Quantile % Return	99th Quantile % Return
BTC	Extreme	25.0	0.46%	0.1	0.7	-1.96%	2.77%
BTC	Non Extreme	25.2	99.43%	28.7	394.8	-5.75%	7.89%
ETH	Extreme	26.5	0.47%	0.1	1.1	-1.90%	2.99%
ETH	Non Extreme	26.7	99.41%	27.1	379.4	-7.49%	7.84%

3.2 ETH Timeline Analysis



3.3 ETH Minutely % Returns

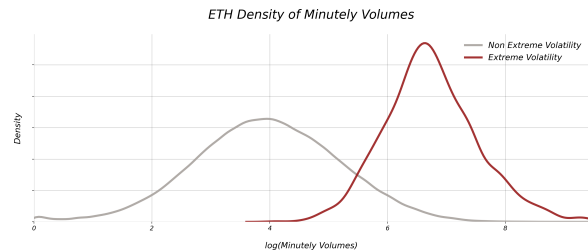
Extreme volatility states show a highly skewed distribution with pronounced tails, indicating rapid and large price movements.



3.4 ETH Minutely Volumes

Extreme periods realized avg. minutely volumes exceeds greatly regular volume, which is expected and

creates incentive to ensure extreme periods are limited in duration.



3.5 Testing codes

Testing focused on assessing predictive accuracy and robustness under varying market conditions. The evaluation framework, publicly available, ensures applicability to real-world cryptocurrency trading scenarios; and calculations are available in the link: *Xtreamly Public Repository*.

4 Implementation

4.1 API Architecture

The API uses a RESTful architecture with secure authentication. Detailed implementation is proprietary and accessible to authorized users via the *Xtreamly API Documentation*.

4.2 API Performance

Xtreamly's API is optimized for low-latency use cases, achieving average response times under 500 ms and 99.9% uptime. Horizontal scaling ensures reliability under high load, typical of real-time trading systems.

5 Limitations and Future Work

While Xtreamly's models demonstrate high accuracy in identifying extreme volatility periods, limitations include sensitivity to unforeseen black swan events and reliance on historical data. Future work will explore additional data inputs and enhanced training techniques.

6 Appendix

6.1 BTC Results

Charts of results are available in the github link: *Xtreamly Public Repository*.